In[1]:=
```
(* Mathematica code for Model3 of Eshra et al. eLife 2021 *)
(* Stefan Hallermann and Hartmut Schmidt Aug 2021 *)
```

Import

general

In[2]:=
```
(* imported data all Ca in uM, all times in ms,
all ampltiudes and Nv in vesicels *)
```

In[3]:=
```
CmToVesConversionFactor = (1/90.12) * (1/70*^-18);(* explained in methods *)
```

In[4]:=
```
rrp = 10;(* pool of release-ready vesicles per connection *)
```

In[5]:=
```
dir = NotebookDirectory[];
SetDirectory[dir];
dataFolder = "../data to fit/";
```

tau1 Cm 5kHz

In[8]:=
```
data = Import[dataFolder <> "all_t1_v02_C5.txt", "Table"];
```

In[9]:=
```
dataT1C5Ca = 0.001 * data[[All, 1]];
dataT1C5RelRate = 1000. * data[[All, 2]];
dataT1C5Delay = data[[All, 3]];
dataT1C5ChiRatio = data[[All, 4]];
dataT1C5Amplitude = CmToVesConversionFactor data[[All, 5]];

dataT1C5Nv = Table[0, {7}];
tmp1 = 1;
tmp2 = 6;
dataT1C5Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
tmp1 += 1;
tmp2 += 1;
dataT1C5Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
tmp1 += 1;
tmp2 += 1;
dataT1C5Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
tmp1 += 1;
tmp2 += 1;
dataT1C5Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
tmp1 += 1;
tmp2 += 1;
dataT1C5Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
tmp1 += 1;
tmp2 += 1;
dataT1C5Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
tmp1 += 1;
tmp2 += 1;
dataT1C5Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
```

tau1 Cm 10kHz

In[22]:=
```
data = Import[dataFolder <> "all_t1_v02_C10.txt", "Table"];
```

In[23]:=
```
dataT1C10Ca = 0.001 * data[[All, 1]];
dataT1C10RelRate = 1000. * data[[All, 2]];
dataT1C10Delay = data[[All, 3]];
dataT1C10ChiRatio = data[[All, 4]];
dataT1C10Amplitude = CmToVesConversionFactor data[[All, 5]];

dataT1C10Nv = Table[0, {7}];
tmp1 = 1;
tmp2 = 6;
dataT1C10Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
tmp1 += 1;
tmp2 += 1;
dataT1C10Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
tmp1 += 1;
tmp2 += 1;
dataT1C10Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
tmp1 += 1;
tmp2 += 1;
dataT1C10Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
tmp1 += 1;
tmp2 += 1;
dataT1C10Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
tmp1 += 1;
tmp2 += 1;
dataT1C10Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
tmp1 += 1;
tmp2 += 1;
dataT1C10Nv[[tmp1]] = CmToVesConversionFactor data[[All, tmp2]];
```

tau1 Deconv

In[36]:=
```
data = Import[dataFolder <> "all_t1_v02_D.txt", "Table"];
```

In[37]:=
```
dataT1DCa = 0.001 * data[[All, 1]];
dataT1DRelRate = 1000. * data[[All, 2]];
dataT1DDelay = data[[All, 3]];
dataT1DChiRatio = data[[All, 4]];
dataT1DAmplitude = data[[All, 5]];

dataT1DNv = Table[0, {7}];
tmp1 = 1; tmp2 = 6; dataT1DNv[[tmp1]] = data[[All, tmp2]];
tmp1 += 1; tmp2 += 1; dataT1DNv[[tmp1]] = data[[All, tmp2]];
tmp1 += 1; tmp2 += 1; dataT1DNv[[tmp1]] = data[[All, tmp2]];
tmp1 += 1; tmp2 += 1; dataT1DNv[[tmp1]] = data[[All, tmp2]];
tmp1 += 1; tmp2 += 1; dataT1DNv[[tmp1]] = data[[All, tmp2]];
tmp1 += 1; tmp2 += 1; dataT1DNv[[tmp1]] = data[[All, tmp2]];
tmp1 += 1; tmp2 += 1; dataT1DNv[[tmp1]] = data[[All, tmp2]];
```

tau2 Cm 5kHz

In[50]:=
```
data = Import[dataFolder <> "all_t2_v02_C5.txt", "Table"];
```

In[51]:=
```
dataT2C5Ca = 0.001 * data[[All, 1]];
dataT2C5RelRate = 1000. * data[[All, 2]];
dataT2C5Amplitude2 = CmToVesConversionFactor data[[All, 3]];
dataT2C5Amplitude1 = CmToVesConversionFactor data[[All, 4]];
```

tau2 Cm 10kHz

In[55]:=
```
data = Import[dataFolder <> "all_t2_v02_C10.txt", "Table"];
```

In[56]:=
```
dataT2C10Ca = 0.001 * data[[All, 1]];
dataT2C10RelRate = 1000. * data[[All, 2]];
dataT2C10Amplitude2 = CmToVesConversionFactor data[[All, 3]];
dataT2C10Amplitude1 = CmToVesConversionFactor data[[All, 4]];
```

tau2 Deconv

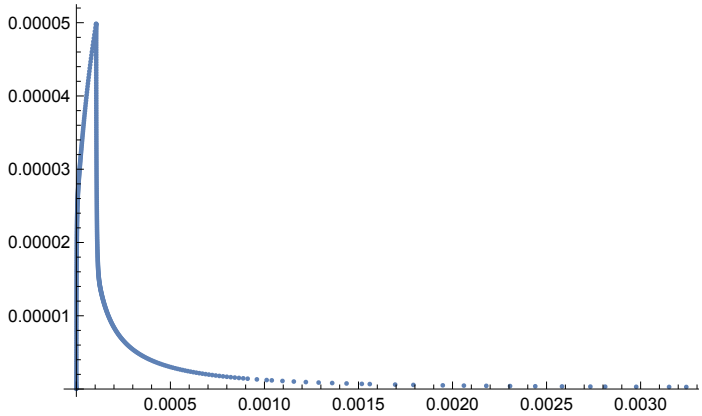
In[59]:=
```
data = Import[dataFolder <> "all_t2_v02_D.txt", "Table"];
```

In[60]:=
```
dataT2DCa = 0.001 * data[[All, 1]];
dataT2DRelRate = 1000. * data[[All, 2]];
dataT2DAmplitude2 = data[[All, 3]];
dataT2DAmplitude1 = data[[All, 4]];
```

local Ca

In[64]:=
```
data = Import[dataFolder <> "local Ca at 20 nm in uM and ms.txt", "Table"];
dataLocalCa = 1*^-6 data[[All, 1]];
dataLocalCaTime = 1*^-3 data[[All, 2]];
ListPlot[Transpose[{dataLocalCaTime, dataLocalCa}], PlotRange → All]
```

Out[67]=



General parameters and definitions

general stuff

In[68]:=
```
(* for calulations: time in s, Ca in M *)
numberOfFitParamToBeSaved = 16;
(*
1 max release

 Mono
2 chi2Mono
3 delayMono
4 ampMono
5 1/tau1Mono

 Bi
6 chi2Mono/chi2Bi
7 delay
8 amp
9 amp1 (=amp*relative amp1)
10 1/tau1
11 1/tau2

 merge
12 delay
13 amp
14 amp1
15 1/tau1
16 1/tau2
*)
cursorStart = -0.002;(*s*)
cursorEnd = 0.01;(*s*)
cursorEndLong = 0.061;(*s*)
timeOfNv = {0.0001, 0.0002, 0.001, 0.005, 0.01, 0.1, 0.4};
SeedRandom[1];
myMaxIterations = 100;
```

In[75]:=
```
timeStart = AbsoluteTime[]
```

Out[75]= $3.839326434455591 \times 10^{9}$

noiseRepeats

In[76]:=
```
noiseRepeats = 50;
(* should be increased to 50 for a full dataset *)
myQuantile1 = 0.25;
myQuantile2 = 0.75;
```

export parameters

In[79]:=
```
dtOfPlotsForExport = 20*^-5;
exportYes = 1;
```

sampling and myNoise

In[81]:=
```
samplingOfDataInKHzC5 = 5;
myNoiseC5 = CmToVesConversionFactor * 1.36937*^-14 / rrp(*cannot be 0*)
signalToNoiseRatioC5 = 1.;(*minimum s-to-n-ratio to attempt fitting*)
dtOfDataC5 = (1 / (1000 * samplingOfDataInKHzC5));

samplingOfDataInKHzC10 = 10;
myNoiseC10 = CmToVesConversionFactor * 1.67583*^-14 / rrp(*cannot be 0*)
signalToNoiseRatioC10 = 1.;(*minimum s-to-n-ratio to attempt fitting*)
dtOfDataC10 = (1 / (1000 * samplingOfDataInKHzC10));

samplingOfDataInKHzD = 10;
myNoiseD = 0.367584 / rrp(*cannot be 0*)
signalToNoiseRatioD = 1.;(*minimum s-to-n-ratio to attempt fitting*)
dtOfDataD = (1 / (1000 * samplingOfDataInKHzD));

samplingOfDataInKHzLong = 1;
myNoiseLong = myNoiseC5;(*cannot be 0*)
dtOfDataLong = (1 / (1000 * samplingOfDataInKHzLong));
```

Out[82]= 0.217071

Out[86]= 0.265651

Out[90]= 0.0367584

number of simulations per DMN

In[96]:=
```
aNumberDMN05 = 2;
aNumberDMN2 = 2;
aNumberDMN10 = 2;

(* for full dataset: *)
aNumberDMN05 = 2 * 20;
aNumberDMN2 = 2 * 17;
aNumberDMN10 = 2 * 10;
```

Exp fit function

In[102]:=
```
myFitMono[t_] :=
  If[t <= delayMono, 0, ampMono (1 - Exp[-(t - delayMono) / tau1Mono])];

myFitBi[t_] := If[t <= delay, 0,
   amp (1 - amp1 Exp[-(t - delay) / tau1] - (1 - amp1) Exp[-(t - delay) / tau2])];

(*guess for 10 uM; will be changed according to a power of 1 law*)(*in s*)
ampGuess = 2.;(*each pool has size 1.0*)
tau1Guess = 0.001;(*in s*)
delayGuess = 0.0005;(*in s*)
amp1Guess = 0.5;
```

Calculate Ca transients

First, the resting conditions are numerically calculated. Subsequently, the resulting values are used as initial conditions for the main simulations of the flash-evoked Ca2+ transitions . All calculations are repeated in a loop with increasing uncaging efficacy for three different DMN concentrations. The resulting free Ca2+ concentration is later used to drive the release schemes.

General definitions for all DMN conc.

In[108]:=
```
CaListReal = CaListDye = {};
```

0.5 mM DMN

general parameters

In[109]:=
```
TimeWindow = 0.006; (*End of simulation*)
tflash = 0.0;  (*Time of flash*)
PlStart = 0.; (*Plot start*)

af = 0.67; (*fast uncaging fraction; Faas et al*)

(*Select dye*)
OGB1 = 0;
OGB5N = 0;
OGB6F = 0;
Fluo5F = 1;

CaRest = 227. * 10^-9; (*Free pre-flash rersting Ca;
equilibrates with all buffers and DM*)
MgT = 0.5 * 10^-3; (*total Mg in pipette*)
γ = 0.; (*Pump rate*)

(*Concentrations of dye, buffers, DM*)
OGtotal = 50. * 10^-6 ;
ATPtotal = 5. * 10^-3 ;
MBtotal = 480. * 10^-6 ;(*(*Delvendahl, PNAS, 2015*)*)

DMT = 0.5 * 10^-3;  (*total concentration of DMn *)
(*uncaging efficiency*)
aStartDMN05 = 0.08;
aEndDMN05 = 0.5;
```

definitions and loop

In[126]:=
```
(*Dye*)
If[OGB1 == 1,
 kOnOG  = 4.3 * 10^8;
kOffOG = 103.;]

If[OGB5N == 1,
 kOnOG  = 2.5 * 10^8;
kOffOG = 6000.;]

If[OGB6F == 1,
 kOnOG  = 3. * 10^8;
kOffOG = 900.;]

If[Fluo5F == 1,
```

```
 kOnOG  = 3. * 10^8;
kOffOG = 249.;] (*Delvendahl PNAS; before: 432*)

KdOG = kOffOG / kOnOG;
kappaOG = OGtotal / KdOG;

(*ATP*)
kOnATP  = 5. * 10^8;
kOffATP = 100 000.;
kOnMgATP  = 1. * 10^7; (*Bollmann Dissertation S. 59; *)
kOffMgATP = 1000.;

KdATP = kOffATP / kOnATP;
kappaATP = ATPtotal / KdATP;
KdMgATP = kOffMgATP / kOnMgATP;

(*DM*)
If[MgT == 0.,
 kOnDM = 1.98 * 10^7; (*Faas Plos Biol, 2007*)
kOffDM = 0.14;
 ,
 kOnDM = 2.9 * 10^7; (*Faas Biophys J, 2005*)
kOffDM = 0.19;
]

(*Mg binding constants for DMn, DMf, DMs*)
kOnMg = 1.3 * 10^5; (*all values for Mg are from Faas et al., 2005*)
kOffMg = 0.2;

(*Ca binding constants for PP*)
kOnPP2 = kOnPP1 = kOnDM;
kOffPP2 = 3.6 * 10 ^ 3;
If[MgT == 0.,
 kOffPP1 = 7. * 10 ^ 4;,
 kOffPP1 = 6.9 * 10 ^ 4; ]

(*Mg binding constants for PP1,PP2*)
kOffMgPP = 3. * 10 ^ 2; (*for PP1,PP2*)
konMgPP = kOnMg; (*koMgPP not used in below diff. eq., only kOnMg*)

(*Equilibrium constants (not complete)*)
KdDM = kOffDM / kOnDM;
KdPP1 = kOffPP1 / kOnPP1;
KdMg = kOffMg / kOnMg;
kappaDM = DMT / KdDM;
```

```
 (*Endogenous buffer*)
kOnMB  = 5 * 10^8;(*Delvendahl, PNAS, 2015*)
kOffMB = 16 000;
KdMB = kOffMB / kOnMB;

TRest = 1000.;


(*----------------------------------  Loop  ----------
 ----------------------------------------*)
(*----------------------------------  Loop  ----------
 ----------------------------------------*)
(*----------------------------------  Loop  ----------
 ----------------------------------------*)


For[aCount = 1, aCount ≤ aNumberDMN05, aCount += 1,
  a = 10 ^ (Log10[aStartDMN05] +
      (aCount - 1) * (Log10[aEndDMN05] - Log10[aStartDMN05]) / (aNumberDMN05 - 1));

  (*------------------------- Resting
    Equations -------------------------------------------*)

  (*Dye*)
  OGRest := {

    OG[0] == OGtotal,
    CaOG[0] == 0,

    OG'[tt] == -kOnOG * CaRest * OG[tt] + kOffOG * CaOG[tt],
    CaOG'[tt] == kOnOG * CaRest * OG[tt] - kOffOG * CaOG[tt]
   }
  ;

  (*ATP*)
  ATPRest := {

    ATP[0] == ATPtotal,
    CaATP[0] == 0,
    MgATP[0] == 0,

    ATP'[tt] == -kOnATP * CaRest * ATP[tt] + kOffATP * CaATP[tt] -
      kOnMgATP * Mg[tt] * ATP[tt] + kOffMgATP * MgATP[tt],
    CaATP'[tt] == kOnATP * CaRest * ATP[tt] - kOffATP * CaATP[tt],
    MgATP'[tt] == kOnMgATP * Mg[tt] * ATP[tt] - kOffMgATP * MgATP[tt]

   }
```

```
;

(*DM nitrophene*)
DMnRest := {

  DMn[0] == (1 - a) * DMT,
  CaDMn[0] == 0.,
  MgDMn[0] == 0.,

  DMn'[tt] == -kOnDM * CaRest * DMn[tt] +
    kOffDM * CaDMn[tt] - kOnMg * Mg[tt] * DMn[tt] + kOffMg * MgDMn[tt],
  CaDMn'[tt] == kOnDM * CaRest * DMn[tt] - kOffDM * CaDMn[tt],
  MgDMn'[tt] == kOnMg * Mg[tt] * DMn[tt] - kOffMg * MgDMn[tt]
 }

;
DMfRest := {

  DMf[0] == a * af * DMT,
  CaDMf[0] == 0.,
  MgDMf[0] == 0.,

  DMf'[tt] == -kOnDM * CaRest * DMf[tt] +
    kOffDM * CaDMf[tt] - kOnMg * Mg[tt] * DMf[tt] + kOffMg * MgDMf[tt],
  CaDMf'[tt] == kOnDM * CaRest * DMf[tt] - kOffDM * CaDMf[tt],
  MgDMf'[tt] == kOnMg * Mg[tt] * DMf[tt] - kOffMg * MgDMf[tt]
 }

;
DMsRest := {

  DMs[0] == a * (1 - af) * DMT,
  CaDMs[0] == 0.,
  MgDMs[0] == 0.,

  DMs'[tt] == -kOnDM * CaRest * DMs[tt] +
    kOffDM * CaDMs[tt] - kOnMg * Mg[tt] * DMs[tt] + kOffMg * MgDMs[tt],
  CaDMs'[tt] == kOnDM * CaRest * DMs[tt] - kOffDM * CaDMs[tt],
  MgDMs'[tt] == kOnMg * Mg[tt] * DMs[tt] - kOffMg * MgDMs[tt]
 }
;

(*Endogeneous buffer*)
MBRest := {

  MB[0] == MBtotal,
```

```
  CaMB[0] == 0,

  MB'[tt] == -kOnMB * CaRest * MB[tt] + kOffMB * CaMB[tt],
  CaMB'[tt] == kOnMB * CaRest * MB[tt] - kOffMB * CaMB[tt]
 }

;

(*Free Mg*)
MgfRest := {
  Mg[0] == MgT,

  Mg'[tt] ==
   -kOnMgATP * Mg[tt] * ATP[tt] + kOffMgATP * MgATP[tt]
    - kOnMg * Mg[tt] * DMn[tt] + kOffMg * MgDMn[tt]
    - kOnMg * Mg[tt] * DMf[tt] + kOffMg * MgDMf[tt]
    - kOnMg * Mg[tt] * DMs[tt] + kOffMg * MgDMs[tt]
 }

;
EqRest := {ATPRest, MgfRest, OGRest, DMnRest, DMfRest, DMsRest, MBRest};
VarsRest := {ATP, Mg, CaATP, MgATP, CaOG, OG, DMn,
  CaDMn, MgDMn, DMf, CaDMf, MgDMf, DMs, CaDMs, MgDMs, MB, CaMB}
;
solr := NDSolve[EqRest, VarsRest, {tt, 0, TRest}]
;

Ca0 = CaRest;
Mg0 = Extract[Mg[TRest] /. solr, 1];
ATP0 = Extract[ATP[TRest] /. solr, 1];
CaATP0 = Extract[CaATP[TRest] /. solr, 1];
MgATP0 = Extract[MgATP[TRest] /. solr, 1];
OG0 = Extract[OG[TRest] /. solr, 1];
CaOG0 = Extract[CaOG[TRest] /. solr, 1];
DMn0 = Extract[DMn[TRest] /. solr, 1];
CaDMn0 = Extract[CaDMn[TRest] /. solr, 1];
MgDMn0 = Extract[MgDMn[TRest] /. solr, 1];
DMf0 = Extract[DMf[TRest] /. solr, 1];
CaDMf0 = Extract[CaDMf[TRest] /. solr, 1];
MgDMf0 = Extract[MgDMf[TRest] /. solr, 1];
DMs0 = Extract[DMs[TRest] /. solr, 1];
CaDMs0 = Extract[CaDMs[TRest] /. solr, 1];
MgDMs0 = Extract[MgDMs[TRest] /. solr, 1];
MB0 = Extract[MB[TRest] /. solr, 1];
CaMB0 = Extract[CaMB[TRest] /. solr, 1];
```

```
  ClearAll[EqRest, VarsRest];


  (*------------------------- Flash
    Equations -------------------------------------------*)

  (*Dye*)
  BufferOG := {

    OG[0] == OG0,
    CaOG[0] == CaOG0,

    OG'[tt] == -kOnOG * Ca[tt] * OG[tt] + kOffOG * CaOG[tt],
    CaOG'[tt] == kOnOG * Ca[tt] * OG[tt] - kOffOG * CaOG[tt]}
  ;

  (*ATP*)
BufferATP := {

    ATP[0] == ATP0,
    CaATP[0] == CaATP0,
    MgATP[0] == MgATP0,

    ATP'[tt] == -kOnATP * Ca[tt] * ATP[tt] + kOffATP * CaATP[tt] -
      kOnMgATP * Mg[tt] * ATP[tt] + kOffMgATP * MgATP[tt],
    CaATP'[tt] == kOnATP * Ca[tt] * ATP[tt] - kOffATP * CaATP[tt],
    MgATP'[tt] == kOnMgATP * Mg[tt] * ATP[tt] - kOffMgATP * MgATP[tt]
   }
  ;

  (*fast (tauf) and slow (taus) time constants for uncageing;
  Faas et al., 2005,2007*)
If[MgT == 0.,
   tauf = 15.2 * 10^-6;  (*Faas, 2007*)
   taus = 1.9 * 10^-3;
   ,
   tauf = 15. * 10^-6;  (*Faas,2005*)
   taus = 2. * 10^-3; ]

  ;

  (*The differential equations*)
  (*non uncaging fraction of DMn*)
  BufferDMn := {

    DMn[0] == DMn0,
    CaDMn[0] == CaDMn0,
```

```
  MgDMn[0] == MgDMn0,

  DMn'[tt] == -kOnDM * Ca[tt] * DMn[tt] +
    kOffDM * CaDMn[tt] - kOnMg * Mg[tt] * DMn[tt] + kOffMg * MgDMn[tt],
  CaDMn'[tt] == kOnDM * Ca[tt] * DMn[tt] - kOffDM * CaDMn[tt],
  MgDMn'[tt] == kOnMg * Mg[tt] * DMn[tt] - kOffMg * MgDMn[tt]
 }
;

(*fast uncaging fraction of DMn*)
BufferDMf := {

  DMf[0] == DMf0,
  CaDMf[0] == CaDMf0,
  MgDMf[0] == MgDMf0,

  DMf'[tt] == -kOnDM * Ca[tt] * DMf[tt] + kOffDM * CaDMf[tt] - kOnMg * Mg[tt] *
     DMf[tt] + kOffMg * MgDMf[tt] - 1 / tauf * DMf[tt] * UnitStep[tt - tflash],
  CaDMf'[tt] == kOnDM * Ca[tt] * DMf[tt] - kOffDM * CaDMf[tt] -
    1 / tauf * CaDMf[tt] * UnitStep[tt - tflash],
  MgDMf'[tt] == kOnMg * Mg[tt] * DMf[tt] - kOffMg * MgDMf[tt] -
    1 / tauf * MgDMf[tt] * UnitStep[tt - tflash]
 }

;
(*slow uncaging fraction of DMn*)
BufferDMs := {

  DMs[0] == DMs0,
  CaDMs[0] == CaDMs0,
  MgDMs[0] == MgDMs0,

  DMs'[tt] == -kOnDM * Ca[tt] * DMs[tt] + kOffDM * CaDMs[tt] - kOnMg * Mg[tt] *
     DMs[tt] + kOffMg * MgDMs[tt] - 1 / taus * DMs[tt] * UnitStep[tt - tflash],
  CaDMs'[tt] == kOnDM * Ca[tt] * DMs[tt] - kOffDM * CaDMs[tt] -
    1 / taus * CaDMs[tt] * UnitStep[tt - tflash],
  MgDMs'[tt] == kOnMg * Mg[tt] * DMs[tt] - kOffMg * MgDMs[tt] -
    1 / taus * MgDMs[tt] * UnitStep[tt - tflash]
 }
;

(*Photoproducts*)
(*PP2: comes from DMf,DMs and MgDMf,MgDMs; but also binds Ca*)
BufferPP2 := {

  PP2[0] == 0,
  CaPP2[0] == 0,
```

```
  MgPP2[0] == 0,

  PP2'[tt] == -kOnPP2 * Ca[tt] * PP2[tt] + kOffPP2 * CaPP2[tt] -
    kOnMg * Mg[tt] * PP2[tt] + kOffMgPP * MgPP2[tt] + 2 * (1 / tauf * DMf[tt] *
        UnitStep[tt - tflash] + 1 / taus * DMs[tt] * UnitStep[tt - tflash])
    + 1 / tauf * MgDMf[tt] * UnitStep[tt - tflash] +
    1 / taus * MgDMs[tt] * UnitStep[tt - tflash],

  CaPP2'[tt] == kOnPP2 * Ca[tt] * PP2[tt] - kOffPP2 * CaPP2[tt],

  MgPP2'[tt] == kOnMg * Mg[tt] * PP2[tt] - kOffMgPP * MgPP2[tt] + 1 / tauf *
     MgDMf[tt] * UnitStep[tt - tflash] + 1 / taus * MgDMs[tt] * UnitStep[tt - tflash]
 }
;

(*PP1: Comes from CaDMf,CaDMs and binds Ca and Mg*)
BufferPP1 := {

  PP1[0] == 0,
  CaPP1[0] == 0,
  MgPP1[0] == 0,

  PP1'[tt] == -kOnPP1 * Ca[tt] * PP1[tt] +
    kOffPP1 * CaPP1[tt] - kOnMg * Mg[tt] * PP1[tt] + kOffMgPP * MgPP1[tt]
    + 1 / tauf * CaDMf[tt] * UnitStep[tt - tflash] +
    1 / taus * CaDMs[tt] * UnitStep[tt - tflash],

  CaPP1'[tt] == kOnPP1 * Ca[tt] * PP1[tt] -
    kOffPP1 * CaPP1[tt] + 1 / tauf * CaDMf[tt] * UnitStep[tt - tflash] +
    1 / taus * CaDMs[tt] * UnitStep[tt - tflash],

  MgPP1'[tt] == kOnMg * Mg[tt] * PP1[tt] - kOffMgPP * MgPP1[tt]

 }
;

(*Endogeneous Buffer*)
BufferMB := {

  MB[0] == MB0,
  CaMB[0] == CaMB0,

  MB'[tt] == -kOnMB * Ca[tt] * MB[tt] + kOffMB * CaMB[tt],
  CaMB'[tt] == kOnMB * Ca[tt] * MB[tt] - kOffMB * CaMB[tt]}

;
```

```
(*Clear[Eqns,Vars,sol]*)

  (*Free Ca*)
  FreeCa := {
    Ca[0] == Ca0,

    Ca'[tt] == -γ * (Ca[tt] - CaRest)
      (*DMn*)
      - kOnPP1 * Ca[tt] * PP1[tt] + kOffPP1 * CaPP1[tt]
      - kOnPP2 * Ca[tt] * PP2[tt] + kOffPP2 * CaPP2[tt]
      - kOnDM * Ca[tt] * DMn[tt] + kOffDM * CaDMn[tt]
      - kOnDM * Ca[tt] * DMf[tt] + kOffDM * CaDMf[tt]
      - kOnDM * Ca[tt] * DMs[tt] + kOffDM * CaDMs[tt]
      (*buffers*)
      - kOnATP * Ca[tt] * ATP[tt] + kOffATP * CaATP[tt]
      - kOnMB * Ca[tt] * MB[tt] + kOffMB * CaMB[tt]
      (*dye*)
      - kOnOG * Ca[tt] * OG[tt] + kOffOG * CaOG[tt]
    }
  ;

  (*Free Mg*)
  FreeMg := {
    Mg[0] == Mg0,

    Mg'[tt] ==
     -kOnMgATP * Mg[tt] * ATP[tt] + kOffMgATP * MgATP[tt]
      - kOnMg * Mg[tt] * DMn[tt] + kOffMg * MgDMn[tt]
      - kOnMg * Mg[tt] * DMf[tt] + kOffMg * MgDMf[tt]
      - kOnMg * Mg[tt] * DMs[tt] + kOffMg * MgDMs[tt]
      - kOnMg * Mg[tt] * PP2[tt] + kOffMgPP * MgPP2[tt]
      - kOnMg * Mg[tt] * PP1[tt] + kOffMgPP * MgPP1[tt]
   }

  ;

  Eqns := {BufferDMn, BufferDMf, BufferDMs, BufferATP,
    BufferPP1, BufferPP2, FreeCa, FreeMg, BufferMB, BufferOG}
  ;
  Vars := {ATP, CaATP, MgATP, Ca, Mg, CaDMn, DMn, CaDMf, DMf, CaDMs,
    DMs, CaPP1, PP1, CaPP2, PP2, MgPP2, MgPP1, MB, CaMB, OG, CaOG}
  ;
  sol := NDSolve[Eqns, Vars, {tt, 0., TimeWindow}
    (*,Method→{"EquationSimplification"->"Solve"}*)]
  ;
  CafP = Extract[Ca[TimeWindow] /. sol, 1];
  CafOG = KdOG * CaOG[tt] / OG[tt];
```

```
    AppendTo[CaListReal, Evaluate[{Ca[tt]} /. sol]];
    AppendTo[CaListDye, Evaluate[{CafOG} /. sol]];

  ];
```

2 mM DMN

general parameters

In[156]:=
```
TimeWindow = 0.006; (*End of simulation*)
tflash = 0.0;  (*Time of flash*)
PlStart = 0.; (*Plot start*)

af = 0.67; (*fast uncaging fraction; Faas et al*)

(*Select dye*)
OGB1 = 0;
OGB5N = 1;
OGB6F = 0;
Fluo5F = 0;

CaRest = 227. * 10^-9; (*Free pre-flash rersting Ca;
equilibrates with all buffers and DM*)
MgT = 0.5 * 10^-3; (*total Mg in pipette*)
γ = 0.; (*Pump rate*)

(*Concentrations of dye, buffers, DM*)
OGtotal = 200. * 10^-6 ;
ATPtotal = 5. * 10^-3 ;
MBtotal = 480. * 10^-6 ;(*(*Delvendahl, PNAS, 2015*)*)

DMT = 2. * 10^-3;  (*total concentration of DMn *)
(*uncaging efficiency*)
aStartDMN2 = 0.15;
aEndDMN2 = 0.55;
```

definitions and loop

In[173]:=
```
(*Dye*)
If[OGB1 == 1,
 kOnOG  = 4.3 * 10^8;
kOffOG = 103.;]
```

```
If[OGB5N == 1,
 kOnOG  = 2.5 * 10^8;
kOffOG = 6000.;]

If[OGB6F == 1,
 kOnOG  = 3. * 10^8;
kOffOG = 900.;]

If[Fluo5F == 1,
 kOnOG  = 3. * 10^8;
kOffOG = 249.;] (*Delvendahl PNAS; before: 432*)

KdOG = kOffOG / kOnOG;
kappaOG = OGtotal / KdOG;

(*ATP*)
kOnATP  = 5. * 10^8;
kOffATP = 100 000.;
kOnMgATP  = 1. * 10^7; (*Bollmann Dissertation S. 59; *)
kOffMgATP = 1000.;

KdATP = kOffATP / kOnATP;
kappaATP = ATPtotal / KdATP;
KdMgATP = kOffMgATP / kOnMgATP;

(*DM*)
If[MgT == 0.,
 kOnDM = 1.98 * 10^7; (*Faas Plos Biol, 2007*)
kOffDM = 0.14;
 ,
 kOnDM = 2.9 * 10^7; (*Faas Biophys J, 2005*)
kOffDM = 0.19;
]

(*Mg binding constants for DMn, DMf, DMs*)
kOnMg = 1.3 * 10^5; (*all values for Mg are from Faas et al., 2005*)
kOffMg = 0.2;

(*Ca binding constants for PP*)
kOnPP2 = kOnPP1 = kOnDM;
kOffPP2 = 3.6 * 10 ^ 3;
If[MgT == 0.,
 kOffPP1 = 7. * 10 ^ 4;,
 kOffPP1 = 6.9 * 10 ^ 4; ]

(*Mg binding constants for PP1,PP2*)
```

```
kOffMgPP = 3. * 10 ^ 2; (*for PP1,PP2*)
konMgPP = kOnMg; (*koMgPP not used in below diff. eq., only kOnMg*)

(*Equilibrium constants (not complete)*)
KdDM = kOffDM / kOnDM;
KdPP1 = kOffPP1 / kOnPP1;
KdMg = kOffMg / kOnMg;
kappaDM = DMT / KdDM;

 (*Endogenous buffer*)
kOnMB = 5 * 10^8;(*Delvendahl, PNAS, 2015*)
kOffMB = 16 000;
KdMB = kOffMB / kOnMB;

TRest = 1000.;


(*----------------------------------  Loop  ----------
 ----------------------------------------*)
(*----------------------------------  Loop  ----------
 ----------------------------------------*)
(*----------------------------------  Loop  ----------
 ----------------------------------------*)

For[aCount = 1, aCount ≤ aNumberDMN2, aCount += 1,
  a = 10 ^ (Log10[aStartDMN2] +
      (aCount - 1) * (Log10[aEndDMN2] - Log10[aStartDMN2]) / (aNumberDMN2 - 1));

  (*------------------------- Resting
    Equations ------------------------------------------*)

  (*Dye*)
  OGRest := {

    OG[0] == OGtotal,
    CaOG[0] == 0,

    OG'[tt] == -kOnOG * CaRest * OG[tt] + kOffOG * CaOG[tt],
    CaOG'[tt] == kOnOG * CaRest * OG[tt] - kOffOG * CaOG[tt]
   }
  ;

  (*ATP*)
  ATPRest := {

    ATP[0] == ATPtotal,
    CaATP[0] == 0,
```

```
  MgATP[0] == 0,

  ATP'[tt] == -kOnATP * CaRest * ATP[tt] + kOffATP * CaATP[tt] -
    kOnMgATP * Mg[tt] * ATP[tt] + kOffMgATP * MgATP[tt],
  CaATP'[tt] == kOnATP * CaRest * ATP[tt] - kOffATP * CaATP[tt],
  MgATP'[tt] == kOnMgATP * Mg[tt] * ATP[tt] - kOffMgATP * MgATP[tt]

 }

;

(*DM nitrophene*)
DMnRest := {

  DMn[0] == (1 - a) * DMT,
  CaDMn[0] == 0.,
  MgDMn[0] == 0.,

  DMn'[tt] == -kOnDM * CaRest * DMn[tt] +
    kOffDM * CaDMn[tt] - kOnMg * Mg[tt] * DMn[tt] + kOffMg * MgDMn[tt],
  CaDMn'[tt] == kOnDM * CaRest * DMn[tt] - kOffDM * CaDMn[tt],
  MgDMn'[tt] == kOnMg * Mg[tt] * DMn[tt] - kOffMg * MgDMn[tt]
 }

;
DMfRest := {

  DMf[0] == a * af * DMT,
  CaDMf[0] == 0.,
  MgDMf[0] == 0.,

  DMf'[tt] == -kOnDM * CaRest * DMf[tt] +
    kOffDM * CaDMf[tt] - kOnMg * Mg[tt] * DMf[tt] + kOffMg * MgDMf[tt],
  CaDMf'[tt] == kOnDM * CaRest * DMf[tt] - kOffDM * CaDMf[tt],
  MgDMf'[tt] == kOnMg * Mg[tt] * DMf[tt] - kOffMg * MgDMf[tt]
 }

;
DMsRest := {

  DMs[0] == a * (1 - af) * DMT,
  CaDMs[0] == 0.,
  MgDMs[0] == 0.,

  DMs'[tt] == -kOnDM * CaRest * DMs[tt] +
    kOffDM * CaDMs[tt] - kOnMg * Mg[tt] * DMs[tt] + kOffMg * MgDMs[tt],
  CaDMs'[tt] == kOnDM * CaRest * DMs[tt] - kOffDM * CaDMs[tt],
```

```
    MgDMs'[tt] == kOnMg * Mg[tt] * DMs[tt] - kOffMg * MgDMs[tt]
   }
  ;

  (*Endogeneous buffer*)
  MBRest := {

    MB[0] == MBtotal,
    CaMB[0] == 0,

    MB'[tt] == -kOnMB * CaRest * MB[tt] + kOffMB * CaMB[tt],
    CaMB'[tt] == kOnMB * CaRest * MB[tt] - kOffMB * CaMB[tt]
   }

  ;

  (*Free Mg*)
  MgfRest := {
    Mg[0] == MgT,

    Mg'[tt] ==
     -kOnMgATP * Mg[tt] * ATP[tt] + kOffMgATP * MgATP[tt]
      - kOnMg * Mg[tt] * DMn[tt] + kOffMg * MgDMn[tt]
      - kOnMg * Mg[tt] * DMf[tt] + kOffMg * MgDMf[tt]
      - kOnMg * Mg[tt] * DMs[tt] + kOffMg * MgDMs[tt]
   }

  ;
  EqRest := {ATPRest, MgfRest, OGRest, DMnRest, DMfRest, DMsRest, MBRest};
  VarsRest := {ATP, Mg, CaATP, MgATP, CaOG, OG, DMn,
    CaDMn, MgDMn, DMf, CaDMf, MgDMf, DMs, CaDMs, MgDMs, MB, CaMB}
  ;
  solr := NDSolve[EqRest, VarsRest, {tt, 0, TRest}]
  ;

  Ca0 = CaRest;
  Mg0 = Extract[Mg[TRest] /. solr, 1];
  ATP0 = Extract[ATP[TRest] /. solr, 1];
  CaATP0 = Extract[CaATP[TRest] /. solr, 1];
  MgATP0 = Extract[MgATP[TRest] /. solr, 1];
  OG0 = Extract[OG[TRest] /. solr, 1];
  CaOG0 = Extract[CaOG[TRest] /. solr, 1];
  DMn0 = Extract[DMn[TRest] /. solr, 1];
  CaDMn0 = Extract[CaDMn[TRest] /. solr, 1];
  MgDMn0 = Extract[MgDMn[TRest] /. solr, 1];
  DMf0 = Extract[DMf[TRest] /. solr, 1];
  CaDMf0 = Extract[CaDMf[TRest] /. solr, 1];
```

```
  MgDMf0 = Extract[MgDMf[TRest] /. solr, 1];
  DMs0 = Extract[DMs[TRest] /. solr, 1];
  CaDMs0 = Extract[CaDMs[TRest] /. solr, 1];
  MgDMs0 = Extract[MgDMs[TRest] /. solr, 1];
  MB0 = Extract[MB[TRest] /. solr, 1];
  CaMB0 = Extract[CaMB[TRest] /. solr, 1];


  ClearAll[EqRest, VarsRest];


  (*------------------------- Flash
    Equations -------------------------------------------*)

  (*Dye*)
  BufferOG := {

    OG[0] == OG0,
    CaOG[0] == CaOG0,

    OG'[tt] == -kOnOG * Ca[tt] * OG[tt] + kOffOG * CaOG[tt],
    CaOG'[tt] == kOnOG * Ca[tt] * OG[tt] - kOffOG * CaOG[tt]}
  ;

  (*ATP*)
BufferATP := {

    ATP[0] == ATP0,
    CaATP[0] == CaATP0,
    MgATP[0] == MgATP0,

    ATP'[tt] == -kOnATP * Ca[tt] * ATP[tt] + kOffATP * CaATP[tt] -
      kOnMgATP * Mg[tt] * ATP[tt] + kOffMgATP * MgATP[tt],
    CaATP'[tt] == kOnATP * Ca[tt] * ATP[tt] - kOffATP * CaATP[tt],
    MgATP'[tt] == kOnMgATP * Mg[tt] * ATP[tt] - kOffMgATP * MgATP[tt]
   }
  ;

  (*fast (tauf) and slow (taus) time constants for uncageing;
  Faas et al., 2005,2007*)
If[MgT == 0.,
   tauf = 15.2 * 10^-6;  (*Faas, 2007*)
   taus = 1.9 * 10^-3;
   ,
   tauf = 15. * 10^-6;  (*Faas,2005*)
   taus = 2. * 10^-3; ]
```

```
;

(*The differential equations*)
(*non uncaging fraction of DMn*)
BufferDMn := {

  DMn[0] == DMn0,
  CaDMn[0] == CaDMn0,
  MgDMn[0] == MgDMn0,

  DMn'[tt] == -kOnDM * Ca[tt] * DMn[tt] +
    kOffDM * CaDMn[tt] - kOnMg * Mg[tt] * DMn[tt] + kOffMg * MgDMn[tt],
  CaDMn'[tt] == kOnDM * Ca[tt] * DMn[tt] - kOffDM * CaDMn[tt],
  MgDMn'[tt] == kOnMg * Mg[tt] * DMn[tt] - kOffMg * MgDMn[tt]
 }
;

(*fast uncaging fraction of DMn*)
BufferDMf := {

  DMf[0] == DMf0,
  CaDMf[0] == CaDMf0,
  MgDMf[0] == MgDMf0,

  DMf'[tt] == -kOnDM * Ca[tt] * DMf[tt] + kOffDM * CaDMf[tt] - kOnMg * Mg[tt] *
     DMf[tt] + kOffMg * MgDMf[tt] - 1 / tauf * DMf[tt] * UnitStep[tt - tflash],
  CaDMf'[tt] == kOnDM * Ca[tt] * DMf[tt] - kOffDM * CaDMf[tt] -
    1 / tauf * CaDMf[tt] * UnitStep[tt - tflash],
  MgDMf'[tt] == kOnMg * Mg[tt] * DMf[tt] - kOffMg * MgDMf[tt] -
    1 / tauf * MgDMf[tt] * UnitStep[tt - tflash]
 }

;
(*slow uncaging fraction of DMn*)
BufferDMs := {

  DMs[0] == DMs0,
  CaDMs[0] == CaDMs0,
  MgDMs[0] == MgDMs0,

  DMs'[tt] == -kOnDM * Ca[tt] * DMs[tt] + kOffDM * CaDMs[tt] - kOnMg * Mg[tt] *
     DMs[tt] + kOffMg * MgDMs[tt] - 1 / taus * DMs[tt] * UnitStep[tt - tflash],
  CaDMs'[tt] == kOnDM * Ca[tt] * DMs[tt] - kOffDM * CaDMs[tt] -
    1 / taus * CaDMs[tt] * UnitStep[tt - tflash],
  MgDMs'[tt] == kOnMg * Mg[tt] * DMs[tt] - kOffMg * MgDMs[tt] -
    1 / taus * MgDMs[tt] * UnitStep[tt - tflash]
 }
```

```
;

(*Photoproducts*)
(*PP2: comes from DMf,DMs and MgDMf,MgDMs; but also binds Ca*)
BufferPP2 := {

  PP2[0] == 0,
  CaPP2[0] == 0,
  MgPP2[0] == 0,

  PP2'[tt] == -kOnPP2 * Ca[tt] * PP2[tt] + kOffPP2 * CaPP2[tt] -
    kOnMg * Mg[tt] * PP2[tt] + kOffMgPP * MgPP2[tt] + 2 * (1 / tauf * DMf[tt] *
        UnitStep[tt - tflash] + 1 / taus * DMs[tt] * UnitStep[tt - tflash])
    + 1 / tauf * MgDMf[tt] * UnitStep[tt - tflash] +
    1 / taus * MgDMs[tt] * UnitStep[tt - tflash],

  CaPP2'[tt] == kOnPP2 * Ca[tt] * PP2[tt] - kOffPP2 * CaPP2[tt],

  MgPP2'[tt] == kOnMg * Mg[tt] * PP2[tt] - kOffMgPP * MgPP2[tt] + 1 / tauf *
     MgDMf[tt] * UnitStep[tt - tflash] + 1 / taus * MgDMs[tt] * UnitStep[tt - tflash]
 }
;

(*PP1: Comes from CaDMf,CaDMs and binds Ca and Mg*)
BufferPP1 := {

  PP1[0] == 0,
  CaPP1[0] == 0,
  MgPP1[0] == 0,

  PP1'[tt] == -kOnPP1 * Ca[tt] * PP1[tt] +
    kOffPP1 * CaPP1[tt] - kOnMg * Mg[tt] * PP1[tt] + kOffMgPP * MgPP1[tt]
    + 1 / tauf * CaDMf[tt] * UnitStep[tt - tflash] +
    1 / taus * CaDMs[tt] * UnitStep[tt - tflash],

  CaPP1'[tt] == kOnPP1 * Ca[tt] * PP1[tt] -
    kOffPP1 * CaPP1[tt] + 1 / tauf * CaDMf[tt] * UnitStep[tt - tflash] +
    1 / taus * CaDMs[tt] * UnitStep[tt - tflash],

  MgPP1'[tt] == kOnMg * Mg[tt] * PP1[tt] - kOffMgPP * MgPP1[tt]

 }
;

(*Endogeneous Buffer*)
BufferMB := {
```

```
      MB[0] == MB0,
      CaMB[0] == CaMB0,

      MB'[tt] == -kOnMB * Ca[tt] * MB[tt] + kOffMB * CaMB[tt],
      CaMB'[tt] == kOnMB * Ca[tt] * MB[tt] - kOffMB * CaMB[tt]}

    ;

  (*Clear[Eqns,Vars,sol]*)

    (*Free Ca*)
    FreeCa := {
      Ca[0] == Ca0,

      Ca'[tt] == -γ * (Ca[tt] - CaRest)
        (*DMn*)
        - kOnPP1 * Ca[tt] * PP1[tt] + kOffPP1 * CaPP1[tt]
        - kOnPP2 * Ca[tt] * PP2[tt] + kOffPP2 * CaPP2[tt]
        - kOnDM * Ca[tt] * DMn[tt] + kOffDM * CaDMn[tt]
        - kOnDM * Ca[tt] * DMf[tt] + kOffDM * CaDMf[tt]
        - kOnDM * Ca[tt] * DMs[tt] + kOffDM * CaDMs[tt]
        (*buffers*)
        - kOnATP * Ca[tt] * ATP[tt] + kOffATP * CaATP[tt]
        - kOnMB * Ca[tt] * MB[tt] + kOffMB * CaMB[tt]
        (*dye*)
        - kOnOG * Ca[tt] * OG[tt] + kOffOG * CaOG[tt]
      }
    ;

    (*Free Mg*)
    FreeMg := {
      Mg[0] == Mg0,

      Mg'[tt] ==
       - kOnMgATP * Mg[tt] * ATP[tt] + kOffMgATP * MgATP[tt]
        - kOnMg * Mg[tt] * DMn[tt] + kOffMg * MgDMn[tt]
        - kOnMg * Mg[tt] * DMf[tt] + kOffMg * MgDMf[tt]
        - kOnMg * Mg[tt] * DMs[tt] + kOffMg * MgDMs[tt]
        - kOnMg * Mg[tt] * PP2[tt] + kOffMgPP * MgPP2[tt]
        - kOnMg * Mg[tt] * PP1[tt] + kOffMgPP * MgPP1[tt]
     }

    ;

    Eqns := {BufferDMn, BufferDMf, BufferDMs, BufferATP,
      BufferPP1, BufferPP2, FreeCa, FreeMg, BufferMB, BufferOG}
    ;
```

```
  Vars := {ATP, CaATP, MgATP, Ca, Mg, CaDMn, DMn, CaDMf, DMf, CaDMs,
    DMs, CaPP1, PP1, CaPP2, PP2, MgPP2, MgPP1, MB, CaMB, OG, CaOG}
  ;
  sol := NDSolve[Eqns, Vars, {tt, 0., TimeWindow}
    (*,Method→{"EquationSimplification"->"Solve"}*)]
  ;
  CafP = Extract[Ca[TimeWindow] /. sol, 1];
  CafOG = KdOG * CaOG[tt] / OG[tt];

  AppendTo[CaListReal, Evaluate[{Ca[tt]} /. sol]];
  AppendTo[CaListDye, Evaluate[{CafOG} /. sol]];

 ];
```

10 mM DMN

general parameters

In[203]:=
```
TimeWindow = 0.006; (*End of simulation*)
tflash = 0.0;  (*Time of flash*)
PlStart = 0.; (*Plot start*)

af = 0.67; (*fast uncaging fraction; Faas et al*)

(*Select dye*)
OGB1 = 0;
OGB5N = 1;
OGB6F = 0;
Fluo5F = 0;

CaRest = 227. * 10^-9; (*Free pre-flash rersting Ca;
equilibrates with all buffers and DM*)
MgT = 0.5 * 10^-3; (*total Mg in pipette*)
γ = 0.; (*Pump rate*)

(*Concentrations of dye, buffers, DM*)
OGtotal = 200. * 10^-6 ;
ATPtotal = 5. * 10^-3 ;
MBtotal = 480. * 10^-6 ;(*(*Delvendahl, PNAS, 2015*)*)

DMT = 10. * 10^-3;  (*total concentration of DMn *)
(*uncaging efficiency*)
aStartDMN10 = 0.14;
aEndDMN10 = 0.25;
```

definitions and loop

In[220]:=
```
(*Dye*)
If[OGB1 == 1,
 kOnOG  = 4.3 * 10^8;
kOffOG = 103.;]

If[OGB5N == 1,
 kOnOG  = 2.5 * 10^8;
kOffOG = 6000.;]

If[OGB6F == 1,
 kOnOG  = 3. * 10^8;
kOffOG = 900.;]

If[Fluo5F == 1,
 kOnOG  = 3. * 10^8;
kOffOG = 249.;] (*Delvendahl PNAS; before: 432*)

KdOG = kOffOG / kOnOG;
kappaOG = OGtotal / KdOG;

(*ATP*)
kOnATP  = 5. * 10^8;
kOffATP = 100 000.;
kOnMgATP  = 1. * 10^7; (*Bollmann Dissertation S. 59; *)
kOffMgATP = 1000.;

KdATP = kOffATP / kOnATP;
kappaATP = ATPtotal / KdATP;
KdMgATP = kOffMgATP / kOnMgATP;

(*DM*)
If[MgT == 0.,
 kOnDM = 1.98 * 10^7; (*Faas Plos Biol, 2007*)
kOffDM = 0.14;
 ,
 kOnDM = 2.9 * 10^7; (*Faas Biophys J, 2005*)
kOffDM = 0.19;
]

(*Mg binding constants for DMn, DMf, DMs*)
kOnMg = 1.3 * 10^5; (*all values for Mg are from Faas et al., 2005*)
kOffMg = 0.2;
```

```
(*Ca binding constants for PP*)
kOnPP2 = kOnPP1 = kOnDM;
kOffPP2 = 3.6 * 10 ^ 3;
If[MgT == 0.,
 kOffPP1 = 7. * 10 ^ 4;,
 kOffPP1 = 6.9 * 10 ^ 4; ]

(*Mg binding constants for PP1,PP2*)
kOffMgPP = 3. * 10 ^ 2; (*for PP1,PP2*)
konMgPP = kOnMg; (*koMgPP not used in below diff. eq., only kOnMg*)

(*Equilibrium constants (not complete)*)
KdDM = kOffDM / kOnDM;
KdPP1 = kOffPP1 / kOnPP1;
KdMg = kOffMg / kOnMg;
kappaDM = DMT / KdDM;

 (*Endogenous buffer*)
kOnMB = 5 * 10^8;(*Delvendahl, PNAS, 2015*)
kOffMB = 16 000;
KdMB = kOffMB / kOnMB;

TRest = 1000.;


(*----------------------------------  Loop  ----------
 ----------------------------------------*)
(*----------------------------------  Loop  ----------
 ----------------------------------------*)
(*----------------------------------  Loop  ----------
 ----------------------------------------*)

For[aCount = 1, aCount ≤ aNumberDMN10, aCount += 1,
  a = 10 ^ (Log10[aStartDMN10] +
      (aCount - 1) * (Log10[aEndDMN10] - Log10[aStartDMN10]) / (aNumberDMN10 - 1));

  (*------------------------- Resting
    Equations -------------------------------------------*)

  (*Dye*)
  OGRest := {

    OG[0] == OGtotal,
    CaOG[0] == 0,

    OG'[tt] == -kOnOG * CaRest * OG[tt] + kOffOG * CaOG[tt],
    CaOG'[tt] == kOnOG * CaRest * OG[tt] - kOffOG * CaOG[tt]
```

```
 }
;

(*ATP*)
ATPRest := {

  ATP[0] == ATPtotal,
  CaATP[0] == 0,
  MgATP[0] == 0,

  ATP'[tt] == -kOnATP * CaRest * ATP[tt] + kOffATP * CaATP[tt] -
    kOnMgATP * Mg[tt] * ATP[tt] + kOffMgATP * MgATP[tt],
  CaATP'[tt] == kOnATP * CaRest * ATP[tt] - kOffATP * CaATP[tt],
  MgATP'[tt] == kOnMgATP * Mg[tt] * ATP[tt] - kOffMgATP * MgATP[tt]

 }

;

(*DM nitrophene*)
DMnRest := {

  DMn[0] == (1 - a) * DMT,
  CaDMn[0] == 0.,
  MgDMn[0] == 0.,

  DMn'[tt] == -kOnDM * CaRest * DMn[tt] +
    kOffDM * CaDMn[tt] - kOnMg * Mg[tt] * DMn[tt] + kOffMg * MgDMn[tt],
  CaDMn'[tt] == kOnDM * CaRest * DMn[tt] - kOffDM * CaDMn[tt],
  MgDMn'[tt] == kOnMg * Mg[tt] * DMn[tt] - kOffMg * MgDMn[tt]
 }

;
DMfRest := {

  DMf[0] == a * af * DMT,
  CaDMf[0] == 0.,
  MgDMf[0] == 0.,

  DMf'[tt] == -kOnDM * CaRest * DMf[tt] +
    kOffDM * CaDMf[tt] - kOnMg * Mg[tt] * DMf[tt] + kOffMg * MgDMf[tt],
  CaDMf'[tt] == kOnDM * CaRest * DMf[tt] - kOffDM * CaDMf[tt],
  MgDMf'[tt] == kOnMg * Mg[tt] * DMf[tt] - kOffMg * MgDMf[tt]
 }

;
DMsRest := {
```

```
  DMs[0] == a * (1 - af) * DMT,
  CaDMs[0] == 0.,
  MgDMs[0] == 0.,

  DMs'[tt] == -kOnDM * CaRest * DMs[tt] +
    kOffDM * CaDMs[tt] - kOnMg * Mg[tt] * DMs[tt] + kOffMg * MgDMs[tt],
  CaDMs'[tt] == kOnDM * CaRest * DMs[tt] - kOffDM * CaDMs[tt],
  MgDMs'[tt] == kOnMg * Mg[tt] * DMs[tt] - kOffMg * MgDMs[tt]
 }
;

(*Endogeneous buffer*)
MBRest := {

  MB[0] == MBtotal,
  CaMB[0] == 0,

  MB'[tt] == -kOnMB * CaRest * MB[tt] + kOffMB * CaMB[tt],
  CaMB'[tt] == kOnMB * CaRest * MB[tt] - kOffMB * CaMB[tt]
 }

;

(*Free Mg*)
MgfRest := {
  Mg[0] == MgT,

  Mg'[tt] ==
   -kOnMgATP * Mg[tt] * ATP[tt] + kOffMgATP * MgATP[tt]
    - kOnMg * Mg[tt] * DMn[tt] + kOffMg * MgDMn[tt]
    - kOnMg * Mg[tt] * DMf[tt] + kOffMg * MgDMf[tt]
    - kOnMg * Mg[tt] * DMs[tt] + kOffMg * MgDMs[tt]
 }

;
EqRest := {ATPRest, MgfRest, OGRest, DMnRest, DMfRest, DMsRest, MBRest};
VarsRest := {ATP, Mg, CaATP, MgATP, CaOG, OG, DMn,
  CaDMn, MgDMn, DMf, CaDMf, MgDMf, DMs, CaDMs, MgDMs, MB, CaMB}
;
solr := NDSolve[EqRest, VarsRest, {tt, 0, TRest}]
;

Ca0 = CaRest;
Mg0 = Extract[Mg[TRest] /. solr, 1];
ATP0 = Extract[ATP[TRest] /. solr, 1];
CaATP0 = Extract[CaATP[TRest] /. solr, 1];
```

```
MgATP0 = Extract[MgATP[TRest] /. solr, 1];
OG0 = Extract[OG[TRest] /. solr, 1];
CaOG0 = Extract[CaOG[TRest] /. solr, 1];
DMn0 = Extract[DMn[TRest] /. solr, 1];
CaDMn0 = Extract[CaDMn[TRest] /. solr, 1];
MgDMn0 = Extract[MgDMn[TRest] /. solr, 1];
DMf0 = Extract[DMf[TRest] /. solr, 1];
CaDMf0 = Extract[CaDMf[TRest] /. solr, 1];
MgDMf0 = Extract[MgDMf[TRest] /. solr, 1];
DMs0 = Extract[DMs[TRest] /. solr, 1];
CaDMs0 = Extract[CaDMs[TRest] /. solr, 1];
MgDMs0 = Extract[MgDMs[TRest] /. solr, 1];
MB0 = Extract[MB[TRest] /. solr, 1];
CaMB0 = Extract[CaMB[TRest] /. solr, 1];


ClearAll[EqRest, VarsRest];


(*------------------------- Flash
  Equations -------------------------------------------*)

(*Dye*)
BufferOG := {

  OG[0] == OG0,
  CaOG[0] == CaOG0,

  OG'[tt] == -kOnOG * Ca[tt] * OG[tt] + kOffOG * CaOG[tt],
  CaOG'[tt] == kOnOG * Ca[tt] * OG[tt] - kOffOG * CaOG[tt]}
;

(*ATP*)
BufferATP := {

  ATP[0] == ATP0,
  CaATP[0] == CaATP0,
  MgATP[0] == MgATP0,

  ATP'[tt] == -kOnATP * Ca[tt] * ATP[tt] + kOffATP * CaATP[tt] -
    kOnMgATP * Mg[tt] * ATP[tt] + kOffMgATP * MgATP[tt],
  CaATP'[tt] == kOnATP * Ca[tt] * ATP[tt] - kOffATP * CaATP[tt],
  MgATP'[tt] == kOnMgATP * Mg[tt] * ATP[tt] - kOffMgATP * MgATP[tt]
 }
;

(*fast (tauf) and slow (taus) time constants for uncageing;
```

```
  Faas et al., 2005,2007*)
If[MgT == 0.,
   tauf = 15.2 * 10^-6;  (*Faas, 2007*)
   taus = 1.9 * 10^-3;
   ,
   tauf = 15. * 10^-6;  (*Faas,2005*)
   taus = 2. * 10^-3; ]

  ;

  (*The differential equations*)
  (*non uncaging fraction of DMn*)
  BufferDMn := {

    DMn[0] == DMn0,
    CaDMn[0] == CaDMn0,
    MgDMn[0] == MgDMn0,

    DMn'[tt] == -kOnDM * Ca[tt] * DMn[tt] +
      kOffDM * CaDMn[tt] - kOnMg * Mg[tt] * DMn[tt] + kOffMg * MgDMn[tt],
    CaDMn'[tt] == kOnDM * Ca[tt] * DMn[tt] - kOffDM * CaDMn[tt],
    MgDMn'[tt] == kOnMg * Mg[tt] * DMn[tt] - kOffMg * MgDMn[tt]
   }
  ;

  (*fast uncaging fraction of DMn*)
  BufferDMf := {

    DMf[0] == DMf0,
    CaDMf[0] == CaDMf0,
    MgDMf[0] == MgDMf0,

    DMf'[tt] == -kOnDM * Ca[tt] * DMf[tt] + kOffDM * CaDMf[tt] - kOnMg * Mg[tt] *
       DMf[tt] + kOffMg * MgDMf[tt] - 1 / tauf * DMf[tt] * UnitStep[tt - tflash],
    CaDMf'[tt] == kOnDM * Ca[tt] * DMf[tt] - kOffDM * CaDMf[tt] -
      1 / tauf * CaDMf[tt] * UnitStep[tt - tflash],
    MgDMf'[tt] == kOnMg * Mg[tt] * DMf[tt] - kOffMg * MgDMf[tt] -
      1 / tauf * MgDMf[tt] * UnitStep[tt - tflash]
   }

  ;
  (*slow uncaging fraction of DMn*)
  BufferDMs := {

    DMs[0] == DMs0,
    CaDMs[0] == CaDMs0,
    MgDMs[0] == MgDMs0,
```

```
  DMs'[tt] == -kOnDM * Ca[tt] * DMs[tt] + kOffDM * CaDMs[tt] - kOnMg * Mg[tt] *
     DMs[tt] + kOffMg * MgDMs[tt] - 1 / taus * DMs[tt] * UnitStep[tt - tflash],
  CaDMs'[tt] == kOnDM * Ca[tt] * DMs[tt] - kOffDM * CaDMs[tt] -
    1 / taus * CaDMs[tt] * UnitStep[tt - tflash],
  MgDMs'[tt] == kOnMg * Mg[tt] * DMs[tt] - kOffMg * MgDMs[tt] -
    1 / taus * MgDMs[tt] * UnitStep[tt - tflash]
 }
;

(*Photoproducts*)
(*PP2: comes from DMf,DMs and MgDMf,MgDMs; but also binds Ca*)
BufferPP2 := {

  PP2[0] == 0,
  CaPP2[0] == 0,
  MgPP2[0] == 0,

  PP2'[tt] == -kOnPP2 * Ca[tt] * PP2[tt] + kOffPP2 * CaPP2[tt] -
    kOnMg * Mg[tt] * PP2[tt] + kOffMgPP * MgPP2[tt] + 2 * (1 / tauf * DMf[tt] *
        UnitStep[tt - tflash] + 1 / taus * DMs[tt] * UnitStep[tt - tflash])
    + 1 / tauf * MgDMf[tt] * UnitStep[tt - tflash] +
    1 / taus * MgDMs[tt] * UnitStep[tt - tflash],

  CaPP2'[tt] == kOnPP2 * Ca[tt] * PP2[tt] - kOffPP2 * CaPP2[tt],

  MgPP2'[tt] == kOnMg * Mg[tt] * PP2[tt] - kOffMgPP * MgPP2[tt] + 1 / tauf *
     MgDMf[tt] * UnitStep[tt - tflash] + 1 / taus * MgDMs[tt] * UnitStep[tt - tflash]
 }
;

(*PP1: Comes from CaDMf,CaDMs and binds Ca and Mg*)
BufferPP1 := {

  PP1[0] == 0,
  CaPP1[0] == 0,
  MgPP1[0] == 0,

  PP1'[tt] == -kOnPP1 * Ca[tt] * PP1[tt] +
    kOffPP1 * CaPP1[tt] - kOnMg * Mg[tt] * PP1[tt] + kOffMgPP * MgPP1[tt]
    + 1 / tauf * CaDMf[tt] * UnitStep[tt - tflash] +
    1 / taus * CaDMs[tt] * UnitStep[tt - tflash],

  CaPP1'[tt] == kOnPP1 * Ca[tt] * PP1[tt] -
    kOffPP1 * CaPP1[tt] + 1 / tauf * CaDMf[tt] * UnitStep[tt - tflash] +
    1 / taus * CaDMs[tt] * UnitStep[tt - tflash],
```

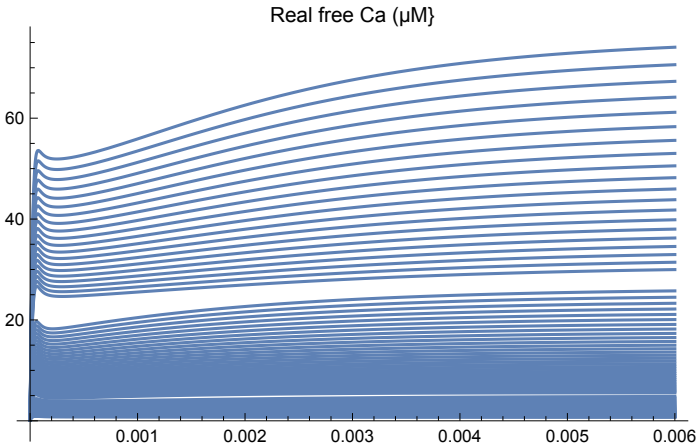
```
    MgPP1'[tt] == kOnMg * Mg[tt] * PP1[tt] - kOffMgPP * MgPP1[tt]

   }
  ;

  (*Endogeneous Buffer*)
  BufferMB := {

    MB[0] == MB0,
    CaMB[0] == CaMB0,

    MB'[tt] == -kOnMB * Ca[tt] * MB[tt] + kOffMB * CaMB[tt],
    CaMB'[tt] == kOnMB * Ca[tt] * MB[tt] - kOffMB * CaMB[tt]}

  ;

(*Clear[Eqns,Vars,sol]*)

  (*Free Ca*)
  FreeCa := {
    Ca[0] == Ca0,

    Ca'[tt] == -γ * (Ca[tt] - CaRest)
      (*DMn*)
      - kOnPP1 * Ca[tt] * PP1[tt] + kOffPP1 * CaPP1[tt]
      - kOnPP2 * Ca[tt] * PP2[tt] + kOffPP2 * CaPP2[tt]
      - kOnDM * Ca[tt] * DMn[tt] + kOffDM * CaDMn[tt]
      - kOnDM * Ca[tt] * DMf[tt] + kOffDM * CaDMf[tt]
      - kOnDM * Ca[tt] * DMs[tt] + kOffDM * CaDMs[tt]
      (*buffers*)
      - kOnATP * Ca[tt] * ATP[tt] + kOffATP * CaATP[tt]
      - kOnMB * Ca[tt] * MB[tt] + kOffMB * CaMB[tt]
      (*dye*)
      - kOnOG * Ca[tt] * OG[tt] + kOffOG * CaOG[tt]
    }
  ;

  (*Free Mg*)
  FreeMg := {
    Mg[0] == Mg0,

    Mg'[tt] ==
     -kOnMgATP * Mg[tt] * ATP[tt] + kOffMgATP * MgATP[tt]
      - kOnMg * Mg[tt] * DMn[tt] + kOffMg * MgDMn[tt]
      - kOnMg * Mg[tt] * DMf[tt] + kOffMg * MgDMf[tt]
      - kOnMg * Mg[tt] * DMs[tt] + kOffMg * MgDMs[tt]
      - kOnMg * Mg[tt] * PP2[tt] + kOffMgPP * MgPP2[tt]
```

```
        - kOnMg * Mg[tt] * PP1[tt] + kOffMgPP * MgPP1[tt]
    }

  ;

  Eqns := {BufferDMn, BufferDMf, BufferDMs, BufferATP,
    BufferPP1, BufferPP2, FreeCa, FreeMg, BufferMB, BufferOG}
  ;
  Vars := {ATP, CaATP, MgATP, Ca, Mg, CaDMn, DMn, CaDMf, DMf, CaDMs,
    DMs, CaPP1, PP1, CaPP2, PP2, MgPP2, MgPP1, MB, CaMB, OG, CaOG}
  ;
  sol := NDSolve[Eqns, Vars, {tt, 0., TimeWindow}
    (*,Method→{"EquationSimplification"->"Solve"}*)]
  ;
  CafP = Extract[Ca[TimeWindow] /. sol, 1];
  CafOG = KdOG * CaOG[tt] / OG[tt];


  AppendTo[CaListReal, Evaluate[{Ca[tt]} /. sol]];
  AppendTo[CaListDye, Evaluate[{CafOG} /. sol]];
 ];
```

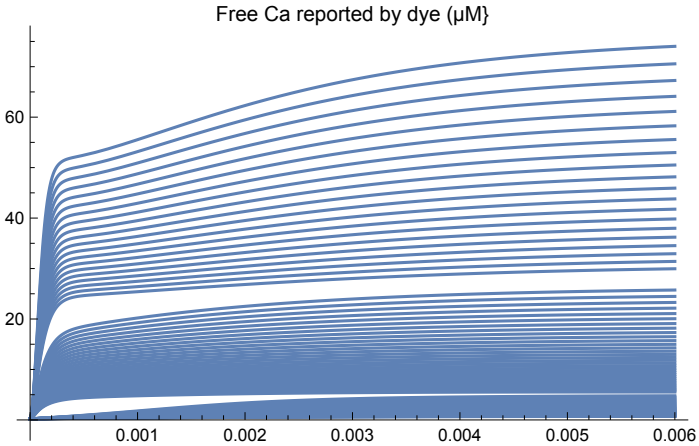
Plot and further processing

```
In[250]:= Plot[10^6 * CaListReal, {tt, 0, TimeWindow}, PlotLabel → "Real free Ca (μM}"]
Plot[10^6 * CaListDye, {tt, 0, TimeWindow},
 PlotLabel → "Free Ca reported by dye (μM}"]
LogPlot[10^6 * CaListReal, {tt, 0, TimeWindow}, PlotLabel → "Real free Ca (μM}"]
LogPlot[10^6 * CaListDye, {tt, 0, TimeWindow},
 PlotLabel → "Free Ca reported by dye (μM}"]
CaListDyePeak =
 Table[NMaximize[{CaListDye[[nn]][[1]][[1]], 0 ≤ tt ≤ TimeWindow}, tt][[1]],
  {nn, Length[CaListDye]}]
  (*"[[1]][[1]]" is neede to get rid of these brackets {{}}*)
```

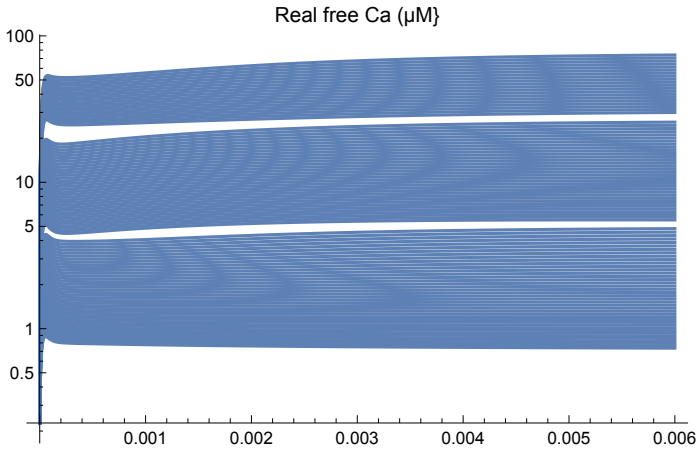
Out[250]=



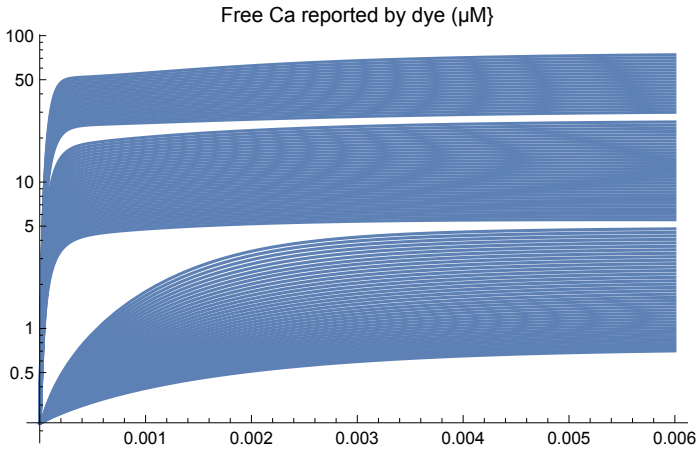
Out[251]=



Out[252]=



Out[253]=



Out[254]= {7.03073×10^{-7}, 7.29825×10^{-7}, 7.58204×10^{-7}, 7.88054×10^{-7}, 8.20427×10^{-7}, 8.54404×10^{-7}, 8.90526×10^{-7}, 9.28936×10^{-7}, 9.68962×10^{-7}, 1.01226×10^{-6}, 1.05883×10^{-6}, 1.10833×10^{-6}, 1.16077×10^{-6}, 1.21664×10^{-6}, 1.27589×10^{-6}, 1.33895×10^{-6}, 1.40597×10^{-6}, 1.47745×10^{-6}, 1.55324×10^{-6}, 1.63202×10^{-6}, 1.71772×10^{-6}, 1.81058×10^{-6}, 1.90732×10^{-6}, 2.01009×10^{-6}, 2.11924×10^{-6}, 2.23489×10^{-6}, 2.35773×10^{-6}, 2.48791×10^{-6}, 2.62605×10^{-6}, 2.77177×10^{-6}, 2.92648×10^{-6}, 3.0905×10^{-6}, 3.26357×10^{-6}, 3.44741×10^{-6}, 3.64088×10^{-6}, 3.84593×10^{-6}, 4.06272×10^{-6}, 4.29254×10^{-6}, 4.53549×10^{-6}, 4.79194×10^{-6}, 5.53376×10^{-6}, 5.7741×10^{-6}, 6.02652×10^{-6}, 6.29189×10^{-6}, 6.57096×10^{-6}, 6.86435×10^{-6}, 7.17282×10^{-6}, 7.4968×10^{-6}, 7.83735×10^{-6}, 8.19526×10^{-6}, 8.57176×10^{-6}, 8.96782×10^{-6}, 9.38444×10^{-6}, 9.82288×10^{-6}, 0.0000102842, 0.00001077, 0.0000112815, 0.0000118202, 0.0000123876, 0.0000129855, 0.0000136155, 0.0000142795, 0.0000149795, 0.0000157174, 0.0000164957, 0.0000173163, 0.0000181821, 0.0000190955, 0.0000200596, 0.0000210761, 0.0000221498, 0.0000232819, 0.0000244782, 0.0000257412, 0.0000299583, 0.0000314124, 0.000032938, 0.0000345385, 0.0000362174, 0.0000379787, 0.0000398264, 0.0000417651, 0.0000437978, 0.0000459306, 0.0000481689, 0.0000505171, 0.0000529808, 0.0000555674, 0.000058281, 0.0000611317, 0.0000641214, 0.0000672653, 0.0000705652, 0.0000740312}

In[255]:=
```
runs = Length[CaListDyePeak];
```

Release scheme and parameters

Define release scheme A

In[256]:=
```
nStates = 7;
matA = Table[0, {nStates}, {nStates}];
```

forward rates

In[258]:=
```
from = 1;(*0 ca bound*)
kk = 5 konA;
matA[[from + 1, from]] += kk; matA[[from, from]] += -kk;

from = 2;
kk = 4 konA;
matA[[from + 1, from]] += kk; matA[[from, from]] += -kk;

from = 3;
kk = 3 konA;
matA[[from + 1, from]] += kk; matA[[from, from]] += -kk;

from = 4;
kk = 2 konA;
matA[[from + 1, from]] += kk; matA[[from, from]] += -kk;

from = 5;(*4 ca bound*)
kk = konA;
matA[[from + 1, from]] += kk; matA[[from, from]] += -kk;

from = 6;(*5 ca bound*)
kk = gammaA;
matA[[from + 1, from]] += kk; matA[[from, from]] += -kk;
```

backwards rates

In[276]:=
```
from = 2;(*1 ca bound*)
kk = koffA bA^0;
matA[[from - 1, from]] += kk; matA[[from, from]] += -kk;

from = 3;
kk = 2 koffA bA^1;
matA[[from - 1, from]] += kk; matA[[from, from]] += -kk;

from = 4;
kk = 3 koffA bA^2;
matA[[from - 1, from]] += kk; matA[[from, from]] += -kk;

from = 5;
kk = 4 koffA bA^3;
matA[[from - 1, from]] += kk; matA[[from, from]] += -kk;

from = 6;(*5 ca bound*)
kk = 5 koffA bA^4;
matA[[from - 1, from]] += kk; matA[[from, from]] += -kk;
```

outflux from matrix

In[291]:=
```
matA[[1, 1]] += -kunprimA - kprimB;
 (*due to multiplication with ss1A[t] in mat.ss it results in:
   -kunprimA ss1A[t] -kprimB ss1A[t]
 *)
```

influx in matrix

In[292]:=
```
matA[[1, 1]] += kprimA (1 - ss1A[t]) / ss1A[t] + kunprimB ss1B[t] / ss1A[t];
(* due to multiplication with ss1A[t] in mat.ss it results in:
   kprimA + kunprimB ss1B[t] *)
```

Matrix

In[293]:=
```
matA // TableForm
```

Out[293]//TableForm=

$-5\,\text{konA} - \text{kprimB} - \text{kunprimA} + \frac{\text{kprimA}\,(1-\text{ss1A}[t])}{\text{ss1A}[t]} + \frac{\text{kunprimB}\,\text{ss1B}[t]}{\text{ss1A}[t]}$	koffA	0
5 konA	$-\text{koffA} - 4\,\text{konA}$	2 bA koff
0	4 konA	-2 bA ko1
0	0	3 konA
0	0	0
0	0	0
0	0	0

Define release scheme B

In[294]:=
```
nStates = 7;
matB = Table[0, {nStates}, {nStates}];
```

forward rates

In[296]:=
```
from = 1;(*0 ca bound*)
kk = 5 konB;
matB[[from + 1, from]] += kk; matB[[from, from]] += -kk;

from = 2;
kk = 4 konB;
matB[[from + 1, from]] += kk; matB[[from, from]] += -kk;

from = 3;
kk = 3 konB;
matB[[from + 1, from]] += kk; matB[[from, from]] += -kk;

from = 4;
kk = 2 konB;
matB[[from + 1, from]] += kk; matB[[from, from]] += -kk;

from = 5;(*4 ca bound*)
kk = konB;
matB[[from + 1, from]] += kk; matB[[from, from]] += -kk;

from = 6;(*5 ca bound*)
kk = gammaB;
matB[[from + 1, from]] += kk; matB[[from, from]] += -kk;
```

backwards rates

In[314]:=
```
from = 2;(*1 ca bound*)
kk = koffB bB^0;
matB[[from - 1, from]] += kk; matB[[from, from]] += -kk;

from = 3;
kk = 2 koffB bB^1;
matB[[from - 1, from]] += kk; matB[[from, from]] += -kk;

from = 4;
kk = 3 koffB bB^2;
matB[[from - 1, from]] += kk; matB[[from, from]] += -kk;

from = 5;
kk = 4 koffB bB^3;
matB[[from - 1, from]] += kk; matB[[from, from]] += -kk;

from = 6;(*5 ca bound*)
kk = 5 koffB bB^4;
matB[[from - 1, from]] += kk; matB[[from, from]] += -kk;
```

outflux from matrix

In[329]:=
```
matB[[1, 1]] += -kunprimB;
(* due to multiplication with ss1B[t] in mat.ss it results in:
  -kunprimB ss1B[t]
*)
```

influx in matrix

In[330]:=
```
matB[[1, 1]] += kprimB ss1A[t] / ss1B[t];
(* due to multiplication with ss1B[t] in mat.ss it results in:
  kprimB ss1A[t]
*)
```

Matrix

In[331]:=
```
matB // TableForm
```

Out[331]//TableForm=

$-5\,\text{konB} - \text{kunprimB} + \frac{\text{kprimB ss1A[t]}}{\text{ss1B[t]}}$	koffB	0	0
5 konB	$-\text{koffB} - 4\,\text{konB}$	2 bB koffB	0
0	4 konB	$-2\,\text{bB koffB} - 3\,\text{konB}$	$3\,\text{bB}^2\,\text{koffB}$
0	0	3 konB	$-3\,\text{bB}^2\,\text{koffB}$
0	0	0	2 konB
0	0	0	0
0	0	0	0

Parameters of release scheme

In[332]:=
```
q10 = 2.3;
tempFact = q10^((37 - 24) / 10);
```

In[334]:=
```
Clear[caFunc, konSchemeA, konSchemeB];
(*Clear is needed if the cell is exectued for a 2nd time when
 caFunc is already set to a value or an Interpolationfunction*)

caRest = CaRest;(*227nM see above*)

(*slow ves*)
affinityFactorA = 3.0;
konSchemeA = 0.5 * caFunc[t] Sqrt[affinityFactorA] tempFact 1.*^8;
(*M^-1 s^-1*)
koffSchemeA = 10. * (1 / Sqrt[affinityFactorA]) tempFact 15 000.;(*s^-1*)
gammaSchemeA = tempFact 6000.;(*s^-1*)
bSchemeA = 0.25;

KdA = 2.*^-6;
kprimSchemeA  = 30. +  0. * 30. * (caFunc[t] / (KdA + caFunc[t]))  ;
kunprimSchemeA = 30. +  0. * 30. * (caRest / (KdA + caRest))  ;

(*fast ves*)
affinityFactorB = 3.0;
konSchemeB = caFunc[t] Sqrt[affinityFactorB] tempFact 1.*^8;(*M^-1 s^-1*)
koffSchemeB = (1 / Sqrt[affinityFactorB]) tempFact 15 000.;(*s^-1*)
gammaSchemeB = tempFact 6000.;(*s^-1*)
bSchemeB = 0.25;

KdB = 2.*^-6;
kprimSchemeB  = 0.5 +  30. * (caFunc[t] / (KdB + caFunc[t]))  ;
kunprimSchemeB = 0.5 +  30. * (caRest / (KdB + caRest))  ;
```

```
repl = {
   konA → konSchemeA,
   koffA → koffSchemeA ,
   gammaA → gammaSchemeA ,
    bA → bSchemeA,

   kprimA → kprimSchemeA ,
   kunprimA → kunprimSchemeA ,


   konB → konSchemeB,
   koffB → koffSchemeB ,
   gammaB → gammaSchemeB ,
    bB → bSchemeB,

   kprimB → kprimSchemeB ,
   kunprimB → kunprimSchemeB
  };
```

In[353]:=
```
tauOfDecayOfUncagedCa = 0.4;
```

Initial occupancy

In[354]:=
```
(*test initial equilibrium occupancy*)
caFunc[t_] := caTmp;
ss0AInitial = kprimSchemeA / kunprimSchemeA;
ss0BInitial = (kprimSchemeA / kunprimSchemeA) * (kprimSchemeB / kunprimSchemeB);
(ss0AInitial /. caTmp → 180*^-9)
(ss0AInitial /. caTmp → 30*^-9)
(ss0AInitial /. caTmp → 180*^-9) / (ss0AInitial /. caTmp → 30*^-9)
(ss0BInitial /. caTmp → 180*^-9)
(ss0BInitial /. caTmp → 30*^-9)
(ss0BInitial /. caTmp → 180*^-9) / (ss0BInitial /. caTmp → 30*^-9)
```

Out[357]= 1.

Out[358]= 1.

Out[359]= 1.

Out[360]= 0.836742

Out[361]= 0.26514

Out[362]= 3.15584

In[363]:=
```
(*calualte initial equilibrium occupancy*)
caFunc[t_] := caRest;
ss0AInitial = kprimSchemeA / kunprimSchemeA;
ss0BInitial = (kprimSchemeA / kunprimSchemeA) * (kprimSchemeB / kunprimSchemeB);
```

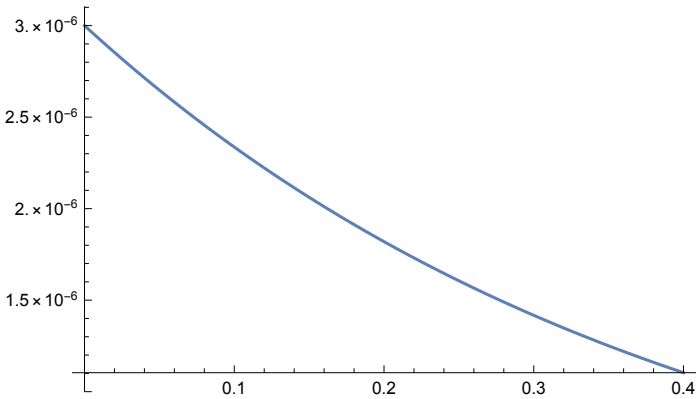
Diff eq.

In[366]:=
```
Clear[caFunc, eq];(*Clear is needed if the cell is exectued for a 2nd time
 when caFunc is already set to a value or an Interpolationfunction*)
ssA[t_] = {ss1A[t], ss2A[t], ss3A[t], ss4A[t], ss5A[t], ss6A[t], ss7A[t]};
ssB[t_] = {ss1B[t], ss2B[t], ss3B[t], ss4B[t], ss5B[t], ss6B[t], ss7B[t]};
eq = {
   ssA'[t] == (matA /. repl).ssA[t],
   ssA[0] == {ss0AInitial, 0, 0, 0, 0, 0, 0},

   ssB'[t] == (matB /. repl).ssB[t],
   ssB[0] == {ss0BInitial, 0, 0, 0, 0, 0, 0}
  };
```

Solve all states

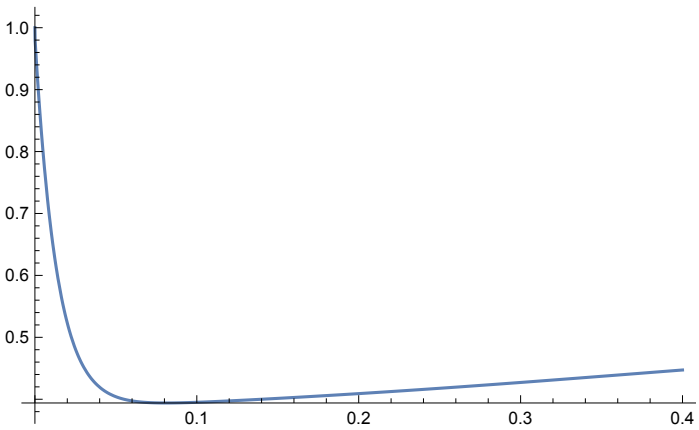
In[370]:=
```
caFunc[t_] := 3*^-6 * Exp[-t / tauOfDecayOfUncagedCa];
Plot[caFunc[t], {t, 0, 0.4}, PlotRange → All]
```

Out[371]=

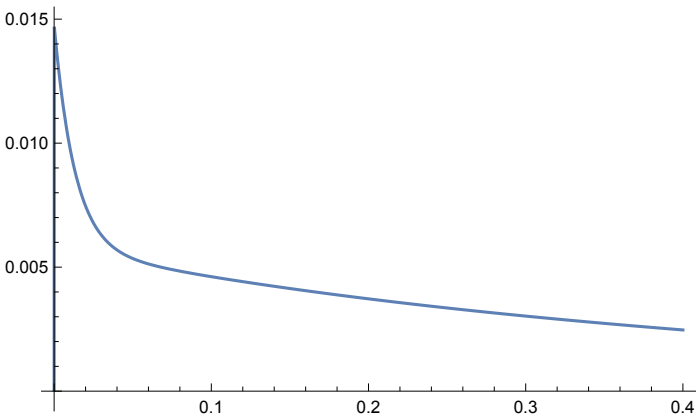


In[372]:=
```
myNDSolveResults = NDSolve[eq, {ss1A, ss2A, ss3A, ss4A, ss5A,
   ss6A, ss7A, ss1B, ss2B, ss3B, ss4B, ss5B, ss6B, ss7B}, {t, 0, 10.}];
tEndForPlot = .4;
Plot[(ss1A[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Plot[(ss2A[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Plot[(ss3A[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Plot[(ss4A[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Plot[(ss5A[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Plot[(ss6A[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Plot[(ss7A[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Print[
 "----------------------------------------------------------------------"]
Plot[(ss1B[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Plot[(ss2B[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Plot[(ss3B[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Plot[(ss4B[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Plot[(ss5B[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Plot[(ss6B[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
Plot[(ss7B[t] /. myNDSolveResults), {t, 0, tEndForPlot}, PlotRange → All]
```

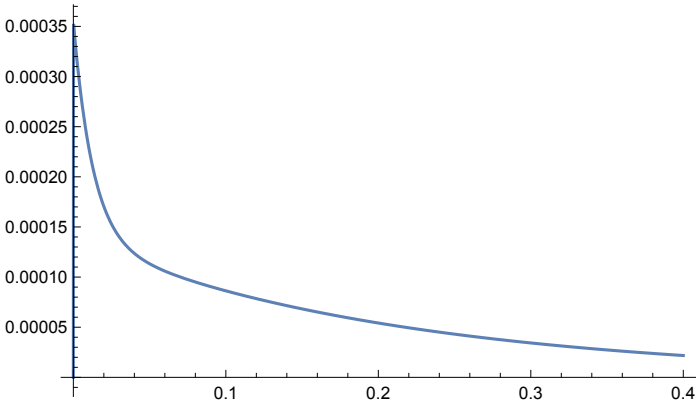
Out[373]=



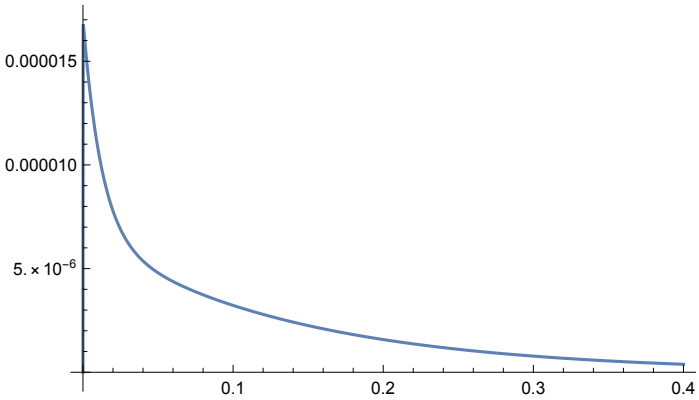
Out[374]=



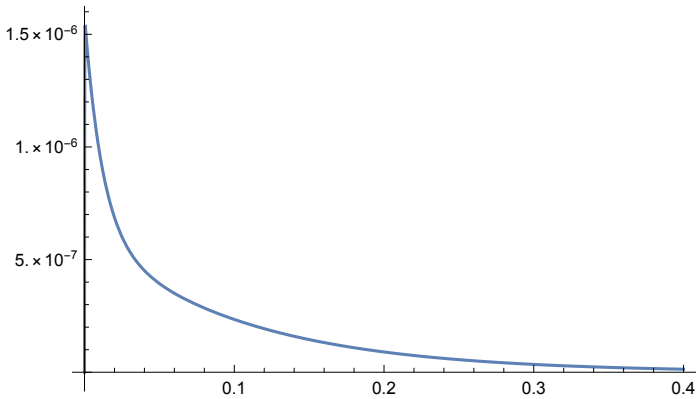
Out[375]=



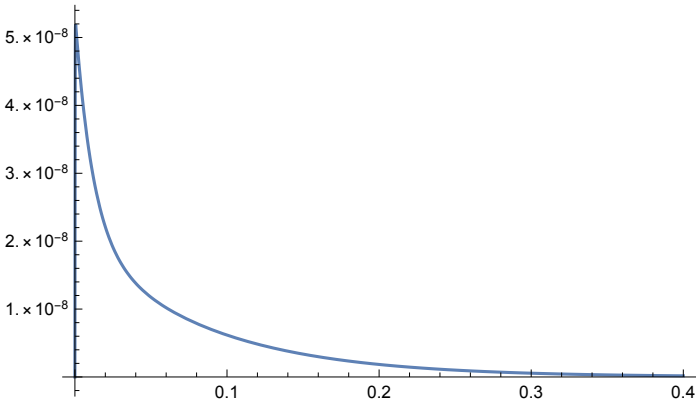
Out[376]=



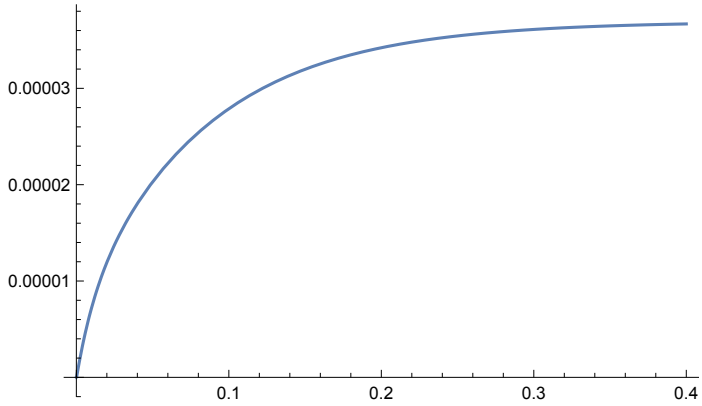
Out[377]=



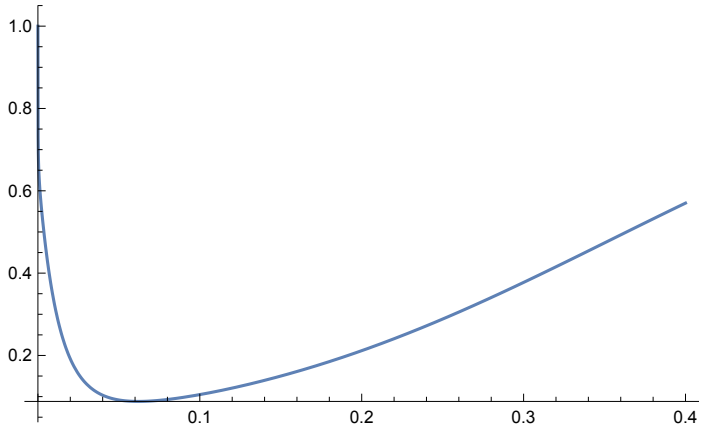
Out[378]=



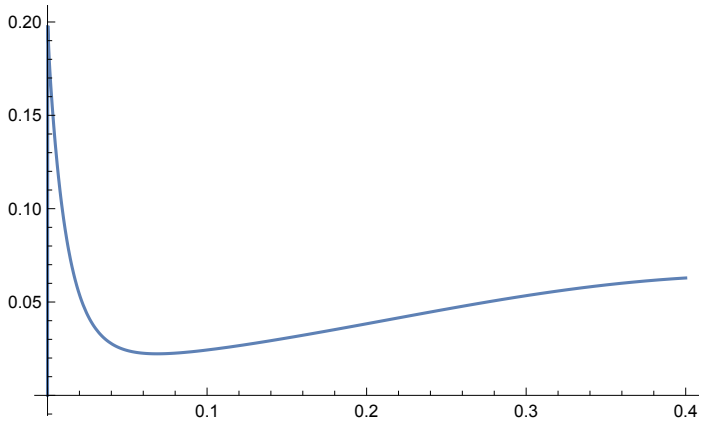
Out[379]=



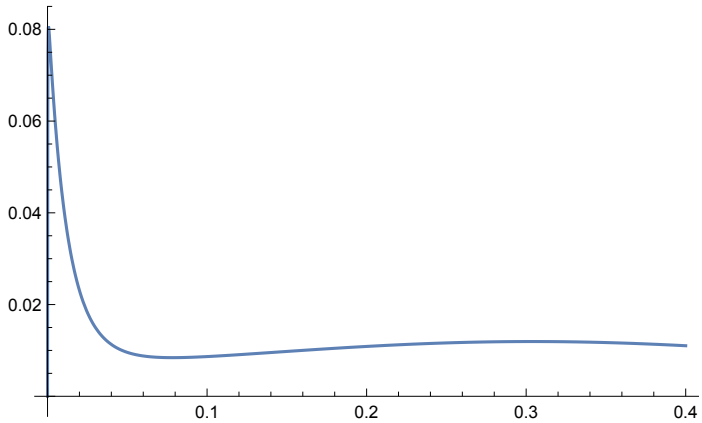
Out[381]=



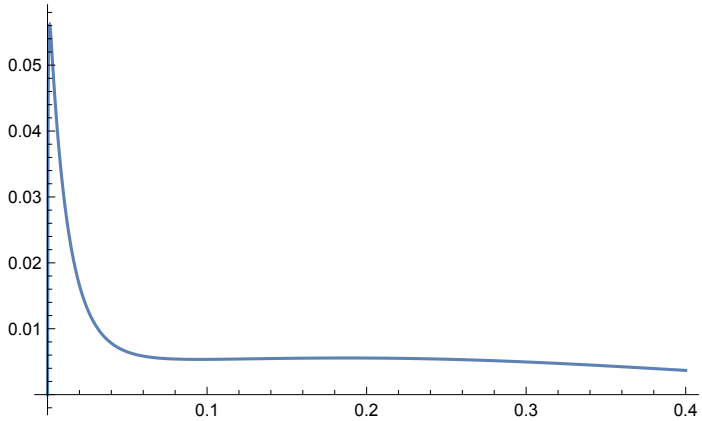
Out[382]=



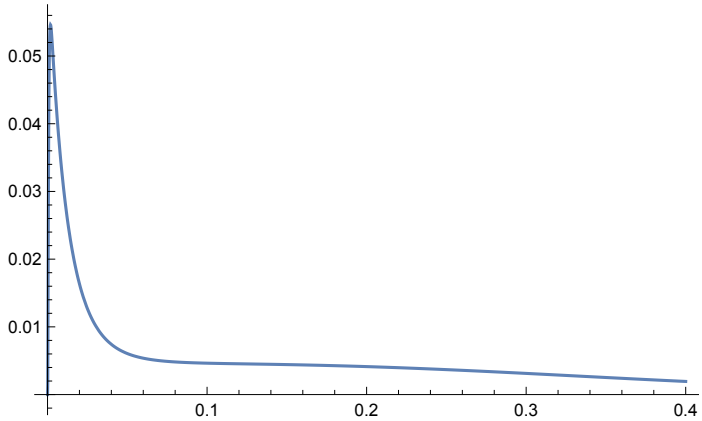
Out[383]=



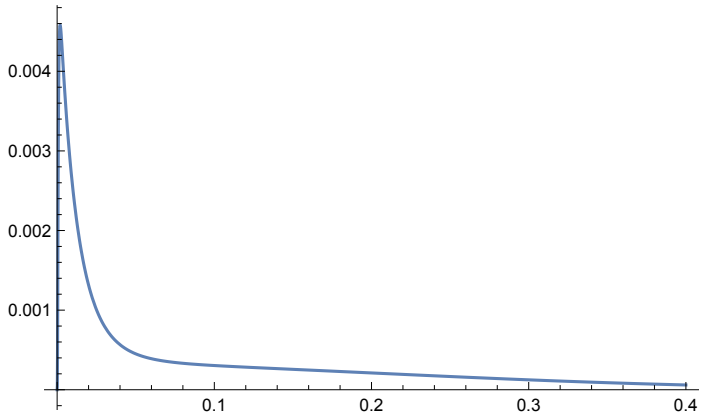
Out[384]=



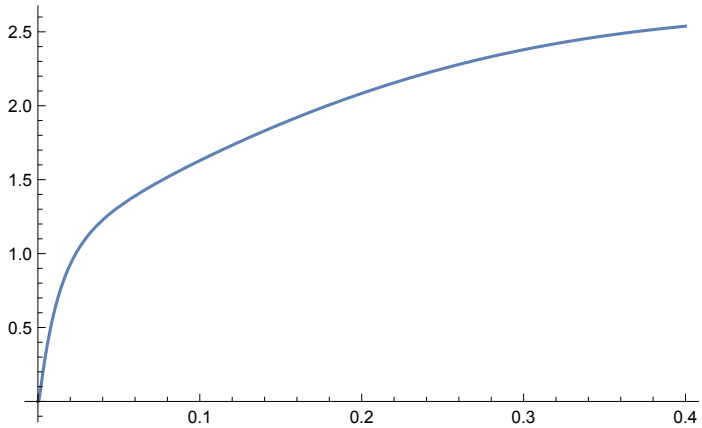
Out[385]=



Out[386]=



Out[387]=



Loop

make lists for later

In[388]:=
```
simCaList = Table[0, {runs}];
simParamNv = Table[0, {7}, {runs}];
```

C5

In[390]:=
```
baselineC5 = Table[{ttt, 0}, {ttt, cursorStart, -1*^-6, dtOfDataC5}];
(*List to save data within loop*)
(*ca; tau; number of released vesilces at time=cursorEnd; delay*)
simParamNoiseC5 = Table[0, {numberOfFitParamToBeSaved}, {noiseRepeats}];
simParamMedianC5 = Table[0, {numberOfFitParamToBeSaved}, {runs}];
simParamQuantile1C5 = Table[0, {numberOfFitParamToBeSaved}, {runs}];
simParamQuantile2C5 = Table[0, {numberOfFitParamToBeSaved}, {runs}];
```

C10

In[395]:=
```
baselineC10 = Table[{ttt, 0}, {ttt, cursorStart, -1*^-6, dtOfDataC10}];
(*List to save data within loop*)
(*ca; tau; number of released vesilces at time=cursorEnd; delay*)
simParamNoiseC10 = Table[0, {numberOfFitParamToBeSaved}, {noiseRepeats}];
simParamMedianC10 = Table[0, {numberOfFitParamToBeSaved}, {runs}];
simParamQuantile1C10 = Table[0, {numberOfFitParamToBeSaved}, {runs}];
simParamQuantile2C10 = Table[0, {numberOfFitParamToBeSaved}, {runs}];
```

D

In[400]:=
```
baselineD = Table[{ttt, 0}, {ttt, cursorStart, -1*^-6, dtOfDataD}];
(*List to save data within loop*)
(*ca; tau; number of released vesilces at time=cursorEnd; delay*)
simParamNoiseD = Table[0, {numberOfFitParamToBeSaved}, {noiseRepeats}];
simParamMedianD = Table[0, {numberOfFitParamToBeSaved}, {runs}];
simParamQuantile1D = Table[0, {numberOfFitParamToBeSaved}, {runs}];
simParamQuantile2D = Table[0, {numberOfFitParamToBeSaved}, {runs}];
```

Long

In[405]:=
```
baselineLong = Table[{ttt, 0}, {ttt, -0.05, -1*^-6, dtOfDataLong}];
```

Loop

```
In[406]:= For[r = 1, r ≤ runs, r += 1,
  myCaNow = CaListDyePeak[[r]];
  lastSimulatedCaListReal = CaListReal[[r]][[1]][[1]] /. tt → TimeWindow;
  (*"[[1]][[1]]" is neede to get rid of these brackets {{}}*)
  Print[
   "-------------------------------------------------------------------------
     -----------------------------------"];
  Print["----------------    Ca = ", 1*^6 myCaNow,
   " uM         -------------------------------------------------------"];
  Print[
   "-------------------------------------------------------------------------
     -----------------------------------"];
  simCaList[[r]] = myCaNow;
  caFunc[ttt_] := If[ttt < TimeWindow,
    CaListReal[[r]][[1]][[1]] /. tt → ttt,
    (*tt because this is the symbol used in "Calculate Ca transients"*)
    lastSimulatedCaListReal * Exp[-ttt / tauOfDecayOfUncagedCa]
   ];
  (* solve Diff Eq.: *)
  myNDSolveResults = NDSolve[eq, {ss7A, ss7B}, {t, 0, 0.4}];
  (* plot results: *)
  fused[t_] := (ss7A[t] + ss7B[t]);
  Plot[(fused[t] /. myNDSolveResults),
    {t, 0, cursorEnd}, PlotRange → All] // Print;
  Plot[(fused[t] /. myNDSolveResults), {t, 0, cursorEndLong},
    PlotRange → All] // Print;
  If[exportYes == 1,
   toExport = Table[{t, (fused[t] /. myNDSolveResults)[[1]]},
     {t, 0., cursorEndLong, dtOfPlotsForExport}];
   Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
     " withoutNoise.txt", toExport, "Table"];
  ];
  (* sample data and add baseline: --------*)
  tmpCumRelC5 = Table[{ttt, (fused[ttt] /. myNDSolveResults)[[1]]},
    {ttt, 0., cursorEnd, dtOfDataC5}];
  tmpToFitC5 = Catenate[{baselineC5, tmpCumRelC5}];
  tmpCumRelC10 = Table[{ttt, (fused[ttt] /. myNDSolveResults)[[1]]},
    {ttt, 0., cursorEnd, dtOfDataC10}];
  tmpToFitC10 = Catenate[{baselineC10, tmpCumRelC10}];
  tmpCumRelD = Table[{ttt, (fused[ttt] /. myNDSolveResults)[[1]]},
    {ttt, 0., cursorEnd, dtOfDataD}];
  tmpToFitD = Catenate[{baselineD, tmpCumRelD}];
  tmpCumRelLong = Table[{ttt, (fused[ttt] /. myNDSolveResults)[[1]]},
    {ttt, 0., cursorEndLong, dtOfDataLong}];
  tmpToFitLong = Catenate[{baselineLong, tmpCumRelLong}];
```

```
(*---------    get amplitude
  without noise and without fitting -----------------*)
For[NvCount = 1, NvCount ≤ 7, NvCount += 1,
 simParamNv[[NvCount, r]] =
   (fused[timeOfNv[[NvCount]]] /. myNDSolveResults)[[1]];
  (* the [[1]] is somehow needed to get rid of a list structure
  probably related to the interpolate function*)
];

(*--------------   Startvalues for
  fit the same for all C5 C10 and D -------------*)
caAdjustedTau1Guess = tau1Guess / ((myCaNow / 10.*^-6) ^4);
caAdjustedTau1Guess = tau1Guess / ((myCaNow / 10.*^-6) ^1);
caAdjustedTau2Guess = 10 caAdjustedTau1Guess;
caAdjustedDelayGuess = delayGuess / ((myCaNow / 10.*^-6) ^1);

(*---------    Fitting of data,
saving of results, and plotting-----------------*)
(*-----------------------------------------------------------------------
                                    ----*)
(*-------------------------------------    C5     ------------------------
                        ----*)
(*-----------------------------------------------------------------------
                                    ----*)
Print[
 "-----------------------------------------------------------------------
   C5"];
(*check that signal is large enough relative to noise to obtain
 useful fit results. If not, do not do fitting and set everything to {}*)
If[simParamNv[[5, r]] > signalToNoiseRatioC5 myNoiseC5, (*add noise
  several times and do the fitting and than average the results*)
 For[noiseN = 1, noiseN ≤ noiseRepeats, noiseN += 1,
  (*Print[noiseN];*)
  tmpToFitNoise = Transpose[{tmpToFitC5[[All, 1]],
     # + RandomVariate[NormalDistribution[0, myNoiseC5]] & /@
      tmpToFitC5[[All, 2]]}];
  (*fit mono-exp*)
  fitResultsTMP = NonlinearModelFit[tmpToFitNoise, myFitMono[x1],
    {{delayMono, delayGuess}, {ampMono, ampGuess}, {tau1Mono,
      caAdjustedTau1Guess}}, x1, MaxIterations → myMaxIterations];
  fitResultMono = fitResultsTMP[{"BestFitParameters"}];
  simParamNoiseC5[[1, noiseN]] = 0; (*not used anymore*)
  simParamNoiseC5[[2, noiseN]] =
   fitResultsTMP["ANOVATableSumsOfSquares"][[2]];
  (*Print[fitResultsTMP["ANOVATableSumsOfSquares"]];*)
  simParamNoiseC5[[3, noiseN]] = (delayMono /. fitResultMono)[[1]];
  simParamNoiseC5[[4, noiseN]] = ((ampMono /. fitResultMono))[[1]];
```

```
simParamNoiseC5[[5, noiseN]] = (1 / (tau1Mono /. fitResultMono))[[1]];
(*fit bi-exp*)
fitResultsTMP =
 NonlinearModelFit[tmpToFitNoise, myFitBi[x1], {{delay, delayGuess},
   {amp, ampGuess}, {amp1, amp1Guess}, {tau1, caAdjustedTau1Guess},
   {tau2, caAdjustedTau2Guess}}, x1, MaxIterations → myMaxIterations];
fitResultBi = fitResultsTMP[{"BestFitParameters"}];
simParamNoiseC5[[6, noiseN]] = simParamNoiseC5[[2, noiseN]] /
  fitResultsTMP["ANOVATableSumsOfSquares"][[2]];
simParamNoiseC5[[7, noiseN]] = (delay /. fitResultBi)[[1]];
simParamNoiseC5[[8, noiseN]] = ((amp /. fitResultBi))[[1]];
simParamNoiseC5[[9, noiseN]] = ((amp amp1 /. fitResultBi))[[1]];
(*relative amp1*)
simParamNoiseC5[[10, noiseN]] = (1 / (tau1 /. fitResultBi))[[1]];
simParamNoiseC5[[11, noiseN]] = (1 / (tau2 /. fitResultBi))[[1]];
(*merge*)
If[
 (*to use the bi-exp fit, the following cirteria should be fullfilled:*)
 (*chi2 should imporve(=decrease) by >10%*)
 (simParamNoiseC5[[6, noiseN]] > 1.04)
  &&
  (*tau1 and tau2 of bi fit should be factor of >3 different*)
  ((simParamNoiseC5[[11, noiseN]] / simParamNoiseC5[[10, noiseN]]) < 3.)
  &&
  (*relative amplitude of 1st component should be > 5% *)
  (((amp1 /. fitResultBi))[[1]] > 0.05)
  &&
  (*relative amplitude of 1st component should be < 95% *)
  (((amp1 /. fitResultBi))[[1]] < 0.95)
 ,
 (*take bi*)
 Print["take bi"];
 simParamNoiseC5[[12, noiseN]] = simParamNoiseC5[[7, noiseN]];
 (*delay*)
 simParamNoiseC5[[13, noiseN]] = simParamNoiseC5[[8, noiseN]];
 (*amp*)
 simParamNoiseC5[[14, noiseN]] = simParamNoiseC5[[9, noiseN]];
 (*amp1*)
 simParamNoiseC5[[15, noiseN]] = simParamNoiseC5[[10, noiseN]];
 (*tau1*)
 simParamNoiseC5[[16, noiseN]] = simParamNoiseC5[[11, noiseN]];(*tau2*)
 ,
 (*take mono*)
 Print["take mono"];
 simParamNoiseC5[[12, noiseN]] = simParamNoiseC5[[3, noiseN]];
 (*delay*)
```

```
    simParamNoiseC5[[13, noiseN]] = simParamNoiseC5[[4, noiseN]];
    (*amp*)
    simParamNoiseC5[[14, noiseN]] = NaN; (*amp1*)
    simParamNoiseC5[[15, noiseN]] = simParamNoiseC5[[5, noiseN]];
    (*tau1*)
    simParamNoiseC5[[16, noiseN]] = NaN;(*tau2*)
  ];
];
(*plot last example of the noise loop*)
gr1 = ListPlot[tmpToFitNoise, PlotRange → All, PlotStyle → Black];
gr2 = Plot[myFitMono[x1] /. fitResultMono,
  {x1, cursorStart, cursorEnd}, PlotRange → All, PlotStyle → {Blue, Dashed}];
gr3 = Plot[myFitBi[x1] /. fitResultBi, {x1, cursorStart, cursorEnd},
  PlotRange → All, PlotStyle → {Green, Dashed}];
Show[gr1, gr2, gr3, PlotRange → All ] // Print;
If[exportYes == 1,
 Export["withinLoop r" <> ToString[r] <> " Ca" <>
   ToString[1*^6 myCaNow] <> " C5 data.txt", tmpToFitNoise, "Table"];
 toExport = Table[{t, (myFitMono[t] /. fitResultMono)[[1]]},
   {t, cursorStart, cursorEnd, dtOfPlotsForExport}];
 Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
   " C5 fitMono.txt", toExport, "Table"];
 toExport = Table[{t, (myFitBi[t] /. fitResultBi)[[1]]},
   {t, cursorStart, cursorEnd, dtOfPlotsForExport}];
 Export["withinLoop r" <> ToString[r] <> " Ca" <>
   ToString[1*^6 myCaNow] <> " C5 fitBi.txt", toExport, "Table"];
];
noiseN = noiseRepeats; (*fit parameter of last noisetrace*)
Print["Mono: chi2 = ", simParamNoiseC5[[2, noiseN]], "     d = ",
 simParamNoiseC5[[2, noiseN]], "     a = ", simParamNoiseC5[[4, noiseN]],
 "     t = ", 1/simParamNoiseC5[[5, noiseN]]];
Print["Bi: ratio chi2Mono/chi2Bi = ", simParamNoiseC5[[6, noiseN]],
 "     d = ", simParamNoiseC5[[7, noiseN]], "     a = ",
 simParamNoiseC5[[8, noiseN]], "     a1 = ", simParamNoiseC5[[9, noiseN]],
 "     t1 =", 1/simParamNoiseC5[[10, noiseN]],
 "     t2 = ", 1/simParamNoiseC5[[11, noiseN]]];
(*average fit results*)
For[p = 1, p ≤ numberOfFitParamToBeSaved, p += 1,
 simParamMedianC5[[p, r]] =
  Median[simParamNoiseC5[[p, All]] /. NaN → Sequence[]];
 simParamQuantile1C5[[p, r]] = Quantile[
   simParamNoiseC5[[p, All]] /. NaN → Sequence[], myQuantile1];
 simParamQuantile2C5[[p, r]] = Quantile[
   simParamNoiseC5[[p, All]] /. NaN → Sequence[], myQuantile2];
];
```

```
(*if tau1 merge > 10 ms, use long trace for fitting*)
If[(1 / simParamMedianC5[[15, r]]) > 0.01,
 Print["Long trace was used for fitting."];
 For[noiseN = 1, noiseN ≤ noiseRepeats, noiseN += 1,
  tmpToFitNoiseLong = Transpose[{tmpToFitLong[[All, 1]],
     # + RandomVariate[NormalDistribution[0, myNoiseLong]] & /@
      tmpToFitLong[[All, 2]]}];
  (*fit mono-exp to Long trace*)
  fitResultsTMP = NonlinearModelFit[tmpToFitNoiseLong, myFitMono[x1],
    {{delayMono, delayGuess}, {ampMono, ampGuess}, {tau1Mono,
      caAdjustedTau1Guess}}, x1, MaxIterations → myMaxIterations];
  fitResultLongMono = fitResultsTMP[{"BestFitParameters"}];
  simParamNoiseC5[[2, noiseN]] =
   fitResultsTMP["ANOVATableSumsOfSquares"][[2]];
  (*Print[fitResultsTMP["ANOVATableSumsOfSquares"]];*)
  simParamNoiseC5[[3, noiseN]] = (delayMono /. fitResultLongMono)[[1]];
  simParamNoiseC5[[4, noiseN]] = ((ampMono /. fitResultLongMono))[[1]];
  simParamNoiseC5[[5, noiseN]] = (1 / (tau1Mono /. fitResultLongMono))[[1]];
  (*fit bi-exp*)
  fitResultsTMP =
   NonlinearModelFit[tmpToFitNoiseLong, myFitBi[x1], {{delay, delayGuess},
     {amp, ampGuess}, {amp1, amp1Guess}, {tau1, caAdjustedTau1Guess},
     {tau2, caAdjustedTau2Guess}}, x1, MaxIterations → myMaxIterations];
  fitResultLongBi = fitResultsTMP[{"BestFitParameters"}];
  simParamNoiseC5[[6, noiseN]] = simParamNoiseC5[[2, noiseN]] /
    fitResultsTMP["ANOVATableSumsOfSquares"][[2]];
  simParamNoiseC5[[7, noiseN]] = (delay /. fitResultLongBi)[[1]];
  simParamNoiseC5[[8, noiseN]] = ((amp /. fitResultLongBi))[[1]];
  simParamNoiseC5[[9, noiseN]] = ((amp amp1 /. fitResultLongBi))[[1]];
  (*relative amp1*)
  simParamNoiseC5[[10, noiseN]] = (1 / (tau1 /. fitResultLongBi))[[1]];
  simParamNoiseC5[[11, noiseN]] = (1 / (tau2 /. fitResultLongBi))[[1]];
  (*merge*)
  If[
   (*to use the bi-exp fit,
   the following cirteria should be fullfilled:*)
   (*chi2 should imporve(=decrease) by >10%*)
   (simParamNoiseC5[[6, noiseN]] > 1.04)
    &&
    (*tau1 and tau2 of bi fit should be factor of >3 different*)
    ((simParamNoiseC5[[11, noiseN]] / simParamNoiseC5[[10, noiseN]]) < 3.)
    &&
    (*relative amplitude of 1st component should be > 5% *)
    (((amp1 /. fitResultLongBi))[[1]] > 0.05)
    &&
    (*relative amplitude of 1st component should be < 95% *)
```

```
    (((amp1 /. fitResultLongBi))[[1]] < 0.95)
   ,
   (*take bi*)
   Print["take bi"];
   simParamNoiseC5[[12, noiseN]] = simParamNoiseC5[[7, noiseN]];
   (*delay*)
   simParamNoiseC5[[13, noiseN]] = simParamNoiseC5[[8, noiseN]];
   (*amp*)
   simParamNoiseC5[[14, noiseN]] = simParamNoiseC5[[9, noiseN]];
   (*amp1*)
   simParamNoiseC5[[15, noiseN]] = simParamNoiseC5[[10, noiseN]];
   (*tau1*)
   simParamNoiseC5[[16, noiseN]] = simParamNoiseC5[[11, noiseN]];(*tau2*)
   ,
   (*take mono*)
   Print["take mono"];
   simParamNoiseC5[[12, noiseN]] = simParamNoiseC5[[3, noiseN]];
   (*delay*)
   simParamNoiseC5[[13, noiseN]] = simParamNoiseC5[[4, noiseN]];
   (*amp*)
   simParamNoiseC5[[14, noiseN]] = NaN; (*amp1*)
   simParamNoiseC5[[15, noiseN]] = simParamNoiseC5[[5, noiseN]];
   (*tau1*)
   simParamNoiseC5[[16, noiseN]] = NaN;(*tau2*)
  ];
 ];
 (*plot last example of the noise loop*)
 gr1 = ListPlot[tmpToFitNoiseLong, PlotRange → All, PlotStyle → Black];
 gr2 = Plot[myFitMono[x1] /. fitResultLongMono, {x1, cursorStart,
    cursorEndLong}, PlotRange → All, PlotStyle → {Blue, Dashed}];
 gr3 = Plot[myFitBi[x1] /. fitResultLongBi, {x1, cursorStart, cursorEndLong},
   PlotRange → All, PlotStyle → {Green, Dashed}];
 Show[gr1, gr2, gr3, PlotRange → All ] // Print;
 If[exportYes == 1,
  Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
    " C5 dataLong.txt", tmpToFitNoiseLong, "Table"];
  toExport = Table[{t, (myFitMono[t] /. fitResultLongMono)[[1]]},
    {t, cursorStart, cursorEndLong, dtOfPlotsForExport}];
  Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
    " C5 fitLongMono.txt", toExport, "Table"];
  toExport = Table[{t, (myFitBi[t] /. fitResultLongBi)[[1]]},
    {t, cursorStart, cursorEndLong, dtOfPlotsForExport}];
  Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
    " C5 fitLongBi.txt", toExport, "Table"];

 ];
 noiseN = noiseRepeats; (*fit parameter of last noisetrace*)
```

```
  Print["Mono: chi2 = ", simParamNoiseC5[[2, noiseN]], "     d = ",
   simParamNoiseC5[[3, noiseN]], "     a = ", simParamNoiseC5[[4, noiseN]],
   "     t = ", 1/simParamNoiseC5[[5, noiseN]]];
  Print["Bi: ratio chi2Mono/chi2Bi = ", simParamNoiseC5[[6, noiseN]],
   "     d = ", simParamNoiseC5[[7, noiseN]], "     a = ",
   simParamNoiseC5[[8, noiseN]], "     a1 = ", simParamNoiseC5[[9, noiseN]],
   "     t1 =", 1/simParamNoiseC5[[10, noiseN]],
   "     t2 = ", 1/simParamNoiseC5[[11, noiseN]]];
  (*average fit results*)
  For[p = 1, p ≤ numberOfFitParamToBeSaved, p += 1,
   simParamMedianC5[[p, r]] =
    Median[simParamNoiseC5[[p, All]] /. NaN → Sequence[]];
   simParamQuantile1C5[[p, r]] = Quantile[
     simParamNoiseC5[[p, All]] /. NaN → Sequence[], myQuantile1];
   simParamQuantile2C5[[p, r]] = Quantile[
     simParamNoiseC5[[p, All]] /. NaN → Sequence[], myQuantile2];
  ];
 ];

 , (*else: signal is not large enough*)
 For[p = 1, p ≤ numberOfFitParamToBeSaved, p += 1,
   simParamMedianC5[[p, r]] = {};
   simParamQuantile1C5[[p, r]] = {};
   simParamQuantile2C5[[p, r]] = {};
  ];
];


(*---------    Fitting of data,
saving of results, and plotting-----------------*)
(*-----------------------------------------------------------------------
                                        ----*)
(*-------------------------------------    C10     ------------------------
                        ----*)
(*-----------------------------------------------------------------------
                                        ----*)
Print[
 "-----------------------------------------------------------------------
   C10"];
(*check that signal is large enough relative to noise to obtain
 useful fit results. If not, do not do fitting and set everything to {}*)
If[simParamNv[[5, r]] > signalToNoiseRatioC10 myNoiseC10, (*add noise
  and do the fitting several times and then average the results*)
 For[noiseN = 1, noiseN ≤ noiseRepeats, noiseN += 1,
  (*Print[noiseN];*)
  tmpToFitNoise = Transpose[{tmpToFitC10[[All, 1]],
     # + RandomVariate[NormalDistribution[0, myNoiseC10]] & /@
```

```
    tmpToFitC10[[All, 2]]}];
(*fit mono-exp*)
fitResultsTMP = NonlinearModelFit[tmpToFitNoise, myFitMono[x1],
  {{delayMono, delayGuess}, {ampMono, ampGuess}, {tau1Mono,
    caAdjustedTau1Guess}}, x1, MaxIterations → myMaxIterations];
fitResultMono = fitResultsTMP[{"BestFitParameters"}];
simParamNoiseC10[[1, noiseN]] = 0; (*not used anymore*)
simParamNoiseC10[[2, noiseN]] =
 fitResultsTMP["ANOVATableSumsOfSquares"][[2]];
(*Print[fitResultsTMP["ANOVATableSumsOfSquares"]];*)
simParamNoiseC10[[3, noiseN]] = (delayMono /. fitResultMono)[[1]];
simParamNoiseC10[[4, noiseN]] = ((ampMono /. fitResultMono))[[1]];
simParamNoiseC10[[5, noiseN]] = (1 / (tau1Mono /. fitResultMono))[[1]];
(*fit bi-exp*)
fitResultsTMP =
 NonlinearModelFit[tmpToFitNoise, myFitBi[x1], {{delay, delayGuess},
   {amp, ampGuess}, {amp1, amp1Guess}, {tau1, caAdjustedTau1Guess},
   {tau2, caAdjustedTau2Guess}}, x1, MaxIterations → myMaxIterations];
fitResultBi = fitResultsTMP[{"BestFitParameters"}];
simParamNoiseC10[[6, noiseN]] = simParamNoiseC10[[2, noiseN]] /
  fitResultsTMP["ANOVATableSumsOfSquares"][[2]];
simParamNoiseC10[[7, noiseN]] = (delay /. fitResultBi)[[1]];
simParamNoiseC10[[8, noiseN]] = ((amp /. fitResultBi))[[1]];
simParamNoiseC10[[9, noiseN]] = ((amp amp1 /. fitResultBi))[[1]];
(*relative amp1*)
simParamNoiseC10[[10, noiseN]] = (1 / (tau1 /. fitResultBi))[[1]];
simParamNoiseC10[[11, noiseN]] = (1 / (tau2 /. fitResultBi))[[1]];
(*merge*)
If[
 (*to use the bi-exp fit, the following cirteria should be fullfilled:*)
 (*chi2 should improve(=decrease) by >4%*)
 (simParamNoiseC10[[6, noiseN]] > 1.04)
  &&
  (*tau1 and tau2 of bi fit should be factor of >3 different*)
  ((simParamNoiseC10[[11, noiseN]] / simParamNoiseC10[[10, noiseN]]) < 3.)
  &&
  (*relative amplitude of 1st component should be > 5% *)
  (((amp1 /. fitResultBi))[[1]] > 0.05)
  &&
  (*relative amplitude of 1st component should be < 95% *)
  (((amp1 /. fitResultBi))[[1]] < 0.95)
 ,
 (*take bi*)
 Print["take bi"];
 simParamNoiseC10[[12, noiseN]] = simParamNoiseC10[[7, noiseN]];
 (*delay*)
```

```
  simParamNoiseC10[[13, noiseN]] = simParamNoiseC10[[8, noiseN]];
  (*amp*)
  simParamNoiseC10[[14, noiseN]] = simParamNoiseC10[[9, noiseN]];
  (*amp1*)
  simParamNoiseC10[[15, noiseN]] = simParamNoiseC10[[10, noiseN]];
  (*tau1*)
  simParamNoiseC10[[16, noiseN]] = simParamNoiseC10[[11, noiseN]];(*tau2*)
  ,
  (*take mono*)
  Print["take mono"];
  simParamNoiseC10[[12, noiseN]] = simParamNoiseC10[[3, noiseN]];
  (*delay*)
  simParamNoiseC10[[13, noiseN]] = simParamNoiseC10[[4, noiseN]];
  (*amp*)
  simParamNoiseC10[[14, noiseN]] = NaN; (*amp1*)
  simParamNoiseC10[[15, noiseN]] = simParamNoiseC10[[5, noiseN]];
  (*tau1*)
  simParamNoiseC10[[16, noiseN]] = NaN;(*tau2*)
 ];
];
(*plot last example of the noise loop*)
gr1 = ListPlot[tmpToFitNoise, PlotRange → All, PlotStyle → Black];
gr2 = Plot[myFitMono[x1] /. fitResultMono,
  {x1, cursorStart, cursorEnd}, PlotRange → All, PlotStyle → {Blue, Dashed}];
gr3 = Plot[myFitBi[x1] /. fitResultBi, {x1, cursorStart, cursorEnd},
  PlotRange → All, PlotStyle → {Green, Dashed}];
Show[gr1, gr2, gr3, PlotRange → All ] // Print;
If[exportYes == 1,
 Export["withinLoop r" <> ToString[r] <> " Ca" <>
   ToString[1*^6 myCaNow] <> " C10 data.txt", tmpToFitNoise, "Table"];
 toExport = Table[{t, (myFitMono[t] /. fitResultMono)[[1]]},
   {t, cursorStart, cursorEnd, dtOfPlotsForExport}];
 Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
   " C10 fitMono.txt", toExport, "Table"];
 toExport = Table[{t, (myFitBi[t] /. fitResultBi)[[1]]},
   {t, cursorStart, cursorEnd, dtOfPlotsForExport}];
 Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
   " C10 fitBi.txt", toExport, "Table"];
];
noiseN = noiseRepeats; (*fit parameter of last noisetrace*)
Print["Mono: chi2 = ", simParamNoiseC10[[2, noiseN]], "     d = ",
 simParamNoiseC10[[2, noiseN]], "     a = ", simParamNoiseC10[[4, noiseN]],
 "     t = ", 1/simParamNoiseC10[[5, noiseN]]];
Print["Bi: ratio chi2Mono/chi2Bi = ", simParamNoiseC10[[6, noiseN]],
 "     d = ", simParamNoiseC10[[7, noiseN]], "     a = ",
 simParamNoiseC10[[8, noiseN]], "     a1 = ", simParamNoiseC10[[9, noiseN]],
 "     t1 =", 1/simParamNoiseC10[[10, noiseN]],
```

```
 "     t2 = ", 1/simParamNoiseC10[[11, noiseN]]];
(*average fit results*)
For[p = 1, p ≤ numberOfFitParamToBeSaved, p += 1,
 simParamMedianC10[[p, r]] =
  Median[simParamNoiseC10[[p, All]] /. NaN → Sequence[]];
 simParamQuantile1C10[[p, r]] = Quantile[
   simParamNoiseC10[[p, All]] /. NaN → Sequence[], myQuantile1];
 simParamQuantile2C10[[p, r]] = Quantile[
   simParamNoiseC10[[p, All]] /. NaN → Sequence[], myQuantile2];
];

(*if tau1 merge > 10 ms, use long trace for fitting*)
If[(1/simParamMedianC10[[15, r]]) > 0.01,
 Print["Long trace was used for fitting."];
 For[noiseN = 1, noiseN ≤ noiseRepeats, noiseN += 1,
  tmpToFitNoiseLong = Transpose[{tmpToFitLong[[All, 1]],
     # + RandomVariate[NormalDistribution[0, myNoiseLong]] & /@
      tmpToFitLong[[All, 2]]}];
  (*fit mono-exp to Long trace*)
  fitResultsTMP = NonlinearModelFit[tmpToFitNoiseLong, myFitMono[x1],
    {{delayMono, delayGuess}, {ampMono, ampGuess}, {tau1Mono,
      caAdjustedTau1Guess}}, x1, MaxIterations → myMaxIterations];
  fitResultLongMono = fitResultsTMP[{"BestFitParameters"}];
  simParamNoiseC10[[2, noiseN]] =
   fitResultsTMP["ANOVATableSumsOfSquares"][[2]];
  (*Print[fitResultsTMP["ANOVATableSumsOfSquares"]];*)
  simParamNoiseC10[[3, noiseN]] = (delayMono /. fitResultLongMono)[[1]];
  simParamNoiseC10[[4, noiseN]] = ((ampMono /. fitResultLongMono))[[1]];
  simParamNoiseC10[[5, noiseN]] = (1/(tau1Mono /. fitResultLongMono))[[1]];
  (*fit bi-exp*)
  fitResultsTMP =
   NonlinearModelFit[tmpToFitNoiseLong, myFitBi[x1], {{delay, delayGuess},
     {amp, ampGuess}, {amp1, amp1Guess}, {tau1, caAdjustedTau1Guess},
     {tau2, caAdjustedTau2Guess}}, x1, MaxIterations → myMaxIterations];
  fitResultLongBi = fitResultsTMP[{"BestFitParameters"}];
  simParamNoiseC10[[6, noiseN]] = simParamNoiseC10[[2, noiseN]]/
    fitResultsTMP["ANOVATableSumsOfSquares"][[2]];
  simParamNoiseC10[[7, noiseN]] = (delay /. fitResultLongBi)[[1]];
  simParamNoiseC10[[8, noiseN]] = ((amp /. fitResultLongBi))[[1]];
  simParamNoiseC10[[9, noiseN]] = ((amp amp1 /. fitResultLongBi))[[1]];
  (*relative amp1*)
  simParamNoiseC10[[10, noiseN]] = (1/(tau1 /. fitResultLongBi))[[1]];
  simParamNoiseC10[[11, noiseN]] = (1/(tau2 /. fitResultLongBi))[[1]];
  (*merge*)
  If[
   (*to use the bi-exp fit,
```

```
  the following cirteria should be fullfilled:*)
  (*chi2 should improve(=decrease) by >4%*)
  (simParamNoiseC10[[6, noiseN]] > 1.04)
   &&
   (*tau1 and tau2 of bi fit should be factor of >3 different*)
   ((simParamNoiseC10[[11, noiseN]] / simParamNoiseC10[[10, noiseN]]) < 3.)
   &&
   (*relative amplitude of 1st component should be > 5% *)
   (((amp1 /. fitResultLongBi))[[1]] > 0.05)
   &&
   (*relative amplitude of 1st component should be < 95% *)
   (((amp1 /. fitResultLongBi))[[1]] < 0.95)
  ,
  (*take bi*)
  Print["take bi"];
  simParamNoiseC10[[12, noiseN]] = simParamNoiseC10[[7, noiseN]];
  (*delay*)
  simParamNoiseC10[[13, noiseN]] = simParamNoiseC10[[8, noiseN]];
  (*amp*)
  simParamNoiseC10[[14, noiseN]] = simParamNoiseC10[[9, noiseN]];
  (*amp1*)
  simParamNoiseC10[[15, noiseN]] = simParamNoiseC10[[10, noiseN]];
  (*tau1*)
  simParamNoiseC10[[16, noiseN]] = simParamNoiseC10[[11, noiseN]];(*tau2*)
  ,
  (*take mono*)
  Print["take mono"];
  simParamNoiseC10[[12, noiseN]] = simParamNoiseC10[[3, noiseN]];
  (*delay*)
  simParamNoiseC10[[13, noiseN]] = simParamNoiseC10[[4, noiseN]];
  (*amp*)
  simParamNoiseC10[[14, noiseN]] = NaN; (*amp1*)
  simParamNoiseC10[[15, noiseN]] = simParamNoiseC10[[5, noiseN]];
  (*tau1*)
  simParamNoiseC10[[16, noiseN]] = NaN;(*tau2*)
 ];
];
(*plot last example of the noise loop*)
gr1 = ListPlot[tmpToFitNoiseLong, PlotRange → All, PlotStyle → Black];
gr2 = Plot[myFitMono[x1] /. fitResultLongMono, {x1, cursorStart,
   cursorEndLong}, PlotRange → All, PlotStyle → {Blue, Dashed}];
gr3 = Plot[myFitBi[x1] /. fitResultLongBi, {x1, cursorStart, cursorEndLong},
  PlotRange → All, PlotStyle → {Green, Dashed}];
Show[gr1, gr2, gr3, PlotRange → All ] // Print;
If[exportYes == 1,
 Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
   " C10 dataLong.txt", tmpToFitNoiseLong, "Table"];
```

```
    toExport = Table[{t, (myFitMono[t] /. fitResultLongMono)[[1]]},
      {t, cursorStart, cursorEndLong, dtOfPlotsForExport}];
    Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
      " C10 fitLongMono.txt", toExport, "Table"];
    toExport = Table[{t, (myFitBi[t] /. fitResultLongBi)[[1]]},
      {t, cursorStart, cursorEndLong, dtOfPlotsForExport}];
    Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
      " C10 fitLongBi.txt", toExport, "Table"];

  ];
  noiseN = noiseRepeats; (*fit parameter of last noisetrace*)
  Print["Mono: chi2 = ", simParamNoiseC10[[2, noiseN]], "     d = ",
   simParamNoiseC10[[3, noiseN]], "     a = ", simParamNoiseC10[[4, noiseN]],
   "     t = ", 1/simParamNoiseC10[[5, noiseN]]];
  Print["Bi: ratio chi2Mono/chi2Bi = ", simParamNoiseC10[[6, noiseN]],
   "     d = ", simParamNoiseC10[[7, noiseN]], "     a = ",
   simParamNoiseC10[[8, noiseN]], "     a1 = ", simParamNoiseC10[[9, noiseN]],
   "     t1 =", 1/simParamNoiseC10[[10, noiseN]],
   "     t2 = ", 1/simParamNoiseC10[[11, noiseN]]];
  (*average fit results*)
  For[p = 1, p ≤ numberOfFitParamToBeSaved, p += 1,
   simParamMedianC10[[p, r]] =
    Median[simParamNoiseC10[[p, All]] /. NaN → Sequence[]];
   simParamQuantile1C10[[p, r]] = Quantile[
     simParamNoiseC10[[p, All]] /. NaN → Sequence[], myQuantile1];
   simParamQuantile2C10[[p, r]] = Quantile[
     simParamNoiseC10[[p, All]] /. NaN → Sequence[], myQuantile2];
  ];
 ];

 , (*else: signal is not large enough*)
 For[p = 1, p ≤ numberOfFitParamToBeSaved, p += 1,
   simParamMedianC10[[p, r]] = {};
   simParamQuantile1C10[[p, r]] = {};
   simParamQuantile2C10[[p, r]] = {};
  ];
];

(*---------    Fitting of data,
saving of results, and plotting-----------------*)
(*-----------------------------------------------------------------------
                                        ----*)
(*-------------------------------------    D     --------------------------
                        --*)
(*-----------------------------------------------------------------------
                                        ----*)
Print[
```

```
"-----------------------------------------------------------------------
   D"];
(*check that signal is large enough relative to noise to obtain
 useful fit results. If not, do not do fitting and set everything to {}*)
If[simParamNv[[5, r]] > signalToNoiseRatioD myNoiseD, (*add noise
  several times and do the fitting and than average the results*)
 For[noiseN = 1, noiseN ≤ noiseRepeats, noiseN += 1,
  (*Print[noiseN];*)
  tmpToFitNoise = Transpose[{tmpToFitD[[All, 1]],
     # + RandomVariate[NormalDistribution[0, myNoiseD]] & /@
      tmpToFitD[[All, 2]]}];
  (*fit mono-exp*)
  fitResultsTMP = NonlinearModelFit[tmpToFitNoise, myFitMono[x1],
    {{delayMono, delayGuess}, {ampMono, ampGuess}, {tau1Mono,
      caAdjustedTau1Guess}}, x1, MaxIterations → myMaxIterations];
  fitResultMono = fitResultsTMP[{"BestFitParameters"}];
  simParamNoiseD[[1, noiseN]] = 0; (*not used anymore*)
  simParamNoiseD[[2, noiseN]] =
   fitResultsTMP["ANOVATableSumsOfSquares"][[2]];
  (*Print[fitResultsTMP["ANOVATableSumsOfSquares"]];*)
  simParamNoiseD[[3, noiseN]] = (delayMono /. fitResultMono)[[1]];
  simParamNoiseD[[4, noiseN]] = ((ampMono /. fitResultMono))[[1]];
  simParamNoiseD[[5, noiseN]] = (1 / (tau1Mono /. fitResultMono))[[1]];
  (*fit bi-exp*)
  fitResultsTMP =
   NonlinearModelFit[tmpToFitNoise, myFitBi[x1], {{delay, delayGuess},
     {amp, ampGuess}, {amp1, amp1Guess}, {tau1, caAdjustedTau1Guess},
     {tau2, caAdjustedTau2Guess}}, x1, MaxIterations → myMaxIterations];
  fitResultBi = fitResultsTMP[{"BestFitParameters"}];
  simParamNoiseD[[6, noiseN]] = simParamNoiseD[[2, noiseN]] /
    fitResultsTMP["ANOVATableSumsOfSquares"][[2]];
  simParamNoiseD[[7, noiseN]] = (delay /. fitResultBi)[[1]];
  simParamNoiseD[[8, noiseN]] = ((amp /. fitResultBi))[[1]];
  simParamNoiseD[[9, noiseN]] = ((amp amp1 /. fitResultBi))[[1]];
  (*relative amp1*)
  simParamNoiseD[[10, noiseN]] = (1 / (tau1 /. fitResultBi))[[1]];
  simParamNoiseD[[11, noiseN]] = (1 / (tau2 /. fitResultBi))[[1]];
  (*merge*)
  If[
   (*to use the bi-exp fit, the following cirteria should be fullfilled:*)
   (*chi2 should improve(=decrease) by >4%*)
   (simParamNoiseD[[6, noiseN]] > 1.04)
    &&
    (*tau1 and tau2 of bi fit should be factor of >3 different*)
    ((simParamNoiseD[[11, noiseN]] / simParamNoiseD[[10, noiseN]]) < 3.)
    &&
```

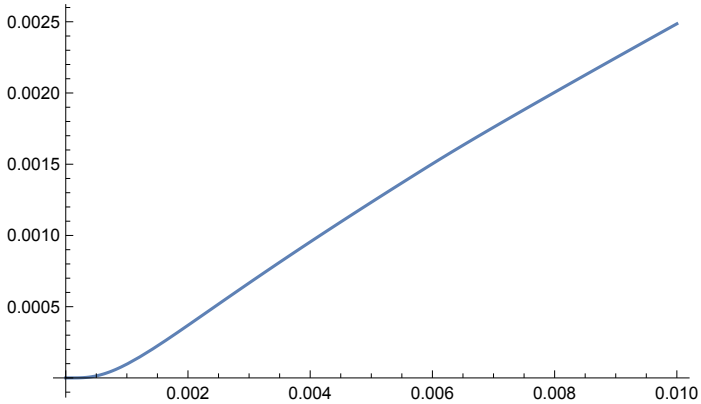
```
    (*relative amplitude of 1st component should be > 5% *)
    (((amp1 /. fitResultBi))[[1]] > 0.05)
    &&
    (*relative amplitude of 1st component should be < 95% *)
    (((amp1 /. fitResultBi))[[1]] < 0.95)
   ,
   (*take bi*)
   Print["take bi"];
   simParamNoiseD[[12, noiseN]] = simParamNoiseD[[7, noiseN]];
   (*delay*)
   simParamNoiseD[[13, noiseN]] = simParamNoiseD[[8, noiseN]];
   (*amp*)
   simParamNoiseD[[14, noiseN]] = simParamNoiseD[[9, noiseN]];
   (*amp1*)
   simParamNoiseD[[15, noiseN]] = simParamNoiseD[[10, noiseN]];
   (*tau1*)
   simParamNoiseD[[16, noiseN]] = simParamNoiseD[[11, noiseN]];(*tau2*)
   ,
   (*take mono*)
   Print["take mono"];
   simParamNoiseD[[12, noiseN]] = simParamNoiseD[[3, noiseN]];
   (*delay*)
   simParamNoiseD[[13, noiseN]] = simParamNoiseD[[4, noiseN]];
   (*amp*)
   simParamNoiseD[[14, noiseN]] = NaN; (*amp1*)
   simParamNoiseD[[15, noiseN]] = simParamNoiseD[[5, noiseN]];
   (*tau1*)
   simParamNoiseD[[16, noiseN]] = NaN;(*tau2*)
  ];
 ];
 (*plot last example of the noise loop*)
 gr1 = ListPlot[tmpToFitNoise, PlotRange → All, PlotStyle → Black];
 gr2 = Plot[myFitMono[x1] /. fitResultMono,
   {x1, cursorStart, cursorEnd}, PlotRange → All, PlotStyle → {Blue, Dashed}];
 gr3 = Plot[myFitBi[x1] /. fitResultBi, {x1, cursorStart, cursorEnd},
   PlotRange → All, PlotStyle → {Green, Dashed}];
 Show[gr1, gr2, gr3, PlotRange → All ] // Print;
 If[exportYes == 1,
  Export["withinLoop r" <> ToString[r] <> " Ca" <>
    ToString[1*^6 myCaNow] <> " D data.txt", tmpToFitNoise, "Table"];
  toExport = Table[{t, (myFitMono[t] /. fitResultMono)[[1]]},
    {t, cursorStart, cursorEnd, dtOfPlotsForExport}];
  Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
    " D fitMono.txt", toExport, "Table"];
  toExport = Table[{t, (myFitBi[t] /. fitResultBi)[[1]]},
    {t, cursorStart, cursorEnd, dtOfPlotsForExport}];
  Export["withinLoop r" <> ToString[r] <> " Ca" <>
```

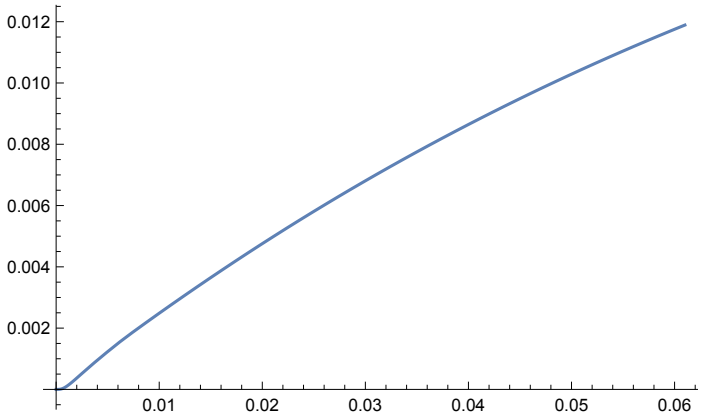
```
    ToString[1*^6 myCaNow] <> " D fitBi.txt", toExport, "Table"];
];
noiseN = noiseRepeats; (*fit parameter of last noisetrace*)
Print["Mono: chi2 = ", simParamNoiseD[[2, noiseN]],
 "     d = ", simParamNoiseD[[2, noiseN]], "     a = ",
 simParamNoiseD[[4, noiseN]], "     t = ", 1/simParamNoiseD[[5, noiseN]]];
Print["Bi: ratio chi2Mono/chi2Bi = ", simParamNoiseD[[6, noiseN]],
 "     d = ", simParamNoiseD[[7, noiseN]], "     a = ",
 simParamNoiseD[[8, noiseN]], "     a1 = ", simParamNoiseD[[9, noiseN]],
 "     t1 =", 1/simParamNoiseD[[10, noiseN]],
 "     t2 = ", 1/simParamNoiseD[[11, noiseN]]];
(*average fit results*)
For[p = 1, p ≤ numberOfFitParamToBeSaved, p += 1,
 simParamMedianD[[p, r]] =
  Median[simParamNoiseD[[p, All]] /. NaN → Sequence[]];
 simParamQuantile1D[[p, r]] = Quantile[
   simParamNoiseD[[p, All]] /. NaN → Sequence[], myQuantile1];
 simParamQuantile2D[[p, r]] = Quantile[
   simParamNoiseD[[p, All]] /. NaN → Sequence[], myQuantile2];
];

(*if tau1 merge > 10 ms, use long trace for fitting*)
If[(1/simParamMedianD[[15, r]]) > 0.01,
 Print["Long trace was used for fitting."];
 For[noiseN = 1, noiseN ≤ noiseRepeats, noiseN += 1,
  tmpToFitNoiseLong = Transpose[{tmpToFitLong[[All, 1]],
     # + RandomVariate[NormalDistribution[0, myNoiseLong]] & /@
      tmpToFitLong[[All, 2]]}];
  (*fit mono-exp to Long trace*)
  fitResultsTMP = NonlinearModelFit[tmpToFitNoiseLong, myFitMono[x1],
    {{delayMono, delayGuess}, {ampMono, ampGuess}, {tau1Mono,
      caAdjustedTau1Guess}}, x1, MaxIterations → myMaxIterations];
  fitResultLongMono = fitResultsTMP[{"BestFitParameters"}];
  simParamNoiseD[[2, noiseN]] =
   fitResultsTMP["ANOVATableSumsOfSquares"][[2]];
  (*Print[fitResultsTMP["ANOVATableSumsOfSquares"]];*)
  simParamNoiseD[[3, noiseN]] = (delayMono /. fitResultLongMono)[[1]];
  simParamNoiseD[[4, noiseN]] = ((ampMono /. fitResultLongMono))[[1]];
  simParamNoiseD[[5, noiseN]] = (1/(tau1Mono /. fitResultLongMono))[[1]];
  (*fit bi-exp*)
  fitResultsTMP =
   NonlinearModelFit[tmpToFitNoiseLong, myFitBi[x1], {{delay, delayGuess},
     {amp, ampGuess}, {amp1, amp1Guess}, {tau1, caAdjustedTau1Guess},
     {tau2, caAdjustedTau2Guess}}, x1, MaxIterations → myMaxIterations];
  fitResultLongBi = fitResultsTMP[{"BestFitParameters"}];
  simParamNoiseD[[6, noiseN]] = simParamNoiseD[[2, noiseN]]/
    fitResultsTMP["ANOVATableSumsOfSquares"][[2]];
```

```
simParamNoiseD[[7, noiseN]] = (delay /. fitResultLongBi)[[1]];
simParamNoiseD[[8, noiseN]] = ((amp /. fitResultLongBi))[[1]];
simParamNoiseD[[9, noiseN]] = ((amp amp1 /. fitResultLongBi))[[1]];
(*relative amp1*)
simParamNoiseD[[10, noiseN]] = (1 / (tau1 /. fitResultLongBi))[[1]];
simParamNoiseD[[11, noiseN]] = (1 / (tau2 /. fitResultLongBi))[[1]];
(*merge*)
If[
 (*to use the bi-exp fit,
 the following cirteria should be fullfilled:*)
 (*chi2 should improve(=decrease) by >4%*)
 (simParamNoiseD[[6, noiseN]] > 1.04)
  &&
  (*tau1 and tau2 of bi fit should be factor of >3 different*)
  ((simParamNoiseD[[11, noiseN]] / simParamNoiseD[[10, noiseN]]) < 3.)
  &&
  (*relative amplitude of 1st component should be > 5% *)
  (((amp1 /. fitResultLongBi))[[1]] > 0.05)
  &&
  (*relative amplitude of 1st component should be < 95% *)
  (((amp1 /. fitResultLongBi))[[1]] < 0.95)
 ,
 (*take bi*)
 Print["take bi"];
 simParamNoiseD[[12, noiseN]] = simParamNoiseD[[7, noiseN]];
 (*delay*)
 simParamNoiseD[[13, noiseN]] = simParamNoiseD[[8, noiseN]];
 (*amp*)
 simParamNoiseD[[14, noiseN]] = simParamNoiseD[[9, noiseN]];
 (*amp1*)
 simParamNoiseD[[15, noiseN]] = simParamNoiseD[[10, noiseN]];
 (*tau1*)
 simParamNoiseD[[16, noiseN]] = simParamNoiseD[[11, noiseN]];(*tau2*)
 ,
 (*take mono*)
 Print["take mono"];
 simParamNoiseD[[12, noiseN]] = simParamNoiseD[[3, noiseN]];
 (*delay*)
 simParamNoiseD[[13, noiseN]] = simParamNoiseD[[4, noiseN]];
 (*amp*)
 simParamNoiseD[[14, noiseN]] = NaN; (*amp1*)
 simParamNoiseD[[15, noiseN]] = simParamNoiseD[[5, noiseN]];
 (*tau1*)
 simParamNoiseD[[16, noiseN]] = NaN;(*tau2*)
 ];
];
```

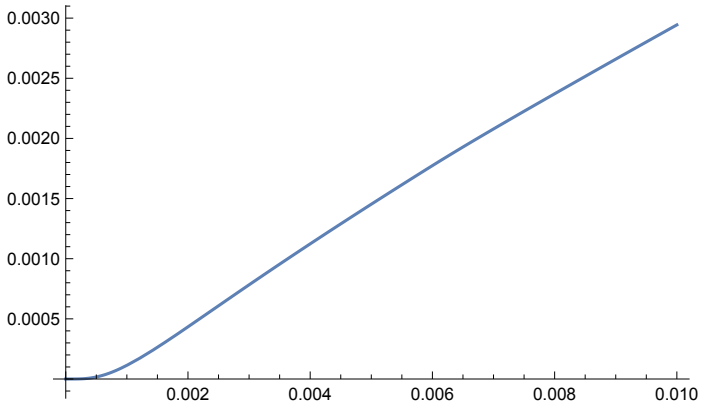
```
 (*plot last example of the noise loop*)
 gr1 = ListPlot[tmpToFitNoiseLong, PlotRange → All, PlotStyle → Black];
 gr2 = Plot[myFitMono[x1] /. fitResultLongMono, {x1, cursorStart,
    cursorEndLong}, PlotRange → All, PlotStyle → {Blue, Dashed}];
 gr3 = Plot[myFitBi[x1] /. fitResultLongBi, {x1, cursorStart, cursorEndLong},
   PlotRange → All, PlotStyle → {Green, Dashed}];
 Show[gr1, gr2, gr3, PlotRange → All ] // Print;
 If[exportYes == 1,
  Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
    " D dataLong.txt", tmpToFitNoiseLong, "Table"];
  toExport = Table[{t, (myFitMono[t] /. fitResultLongMono) [[1]]},
    {t, cursorStart, cursorEndLong, dtOfPlotsForExport}];
  Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
    " D fitLongMono.txt", toExport, "Table"];
  toExport = Table[{t, (myFitBi[t] /. fitResultLongBi) [[1]]},
    {t, cursorStart, cursorEndLong, dtOfPlotsForExport}];
  Export["withinLoop r" <> ToString[r] <> " Ca" <> ToString[1*^6 myCaNow] <>
    " D fitLongBi.txt", toExport, "Table"];

 ];
 noiseN = noiseRepeats; (*fit parameter of last noisetrace*)
 Print["Mono: chi2 = ", simParamNoiseD[[2, noiseN]],
  "     d = ", simParamNoiseD[[3, noiseN]], "     a = ",
  simParamNoiseD[[4, noiseN]], "     t = ", 1/simParamNoiseD[[5, noise N]]];
 Print["Bi: ratio chi2Mono/chi2Bi = ", simParamNoiseD[[6, noiseN]],
  "     d = ", simParamNoiseD[[7, noiseN]], "     a = ",
  simParamNoiseD[[8, noiseN]], "     a1 = ", simParamNoiseD[[9, noiseN]],
  "     t1 =", 1/simParamNoiseD[[10, noiseN]],
  "     t2 = ", 1/simParamNoiseD[[11, noiseN]]];
 (*average fit results*)
 For[p = 1, p ≤ numberOfFitParamToBeSaved, p += 1,
  simParamMedianD[[p, r]] =
   Median[simParamNoiseD[[p, All]] /. NaN → Sequence[]];
  simParamQuantile1D[[p, r]] = Quantile[
    simParamNoiseD[[p, All]] /. NaN → Sequence[], myQuantile1];
  simParamQuantile2D[[p, r]] = Quantile[
    simParamNoiseD[[p, All]] /. NaN → Sequence[], myQuantile2];
 ];
];

, (*else: signal is not large enough*)
For[p = 1, p ≤ numberOfFitParamToBeSaved, p += 1,
  simParamMedianD[[p, r]] = {};
  simParamQuantile1D[[p, r]] = {};
  simParamQuantile2D[[p, r]] = {};
 ];
```

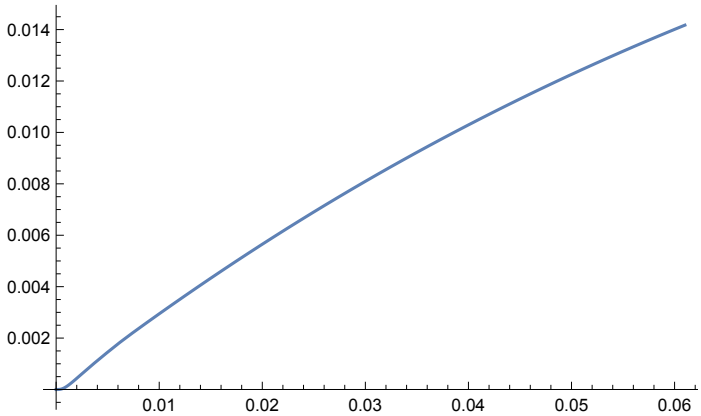
```
  ];
 ];
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 0.703073
  uM          -------------------------------------------------------
-------------------------------------------------------------------------------------
  -------------------------
```






```
---------------------------------------------------------------------------- C5
---------------------------------------------------------------------------- C10
---------------------------------------------------------------------------- D
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 0.729825
  uM          -------------------------------------------------------
-------------------------------------------------------------------------------------
  -------------------------
```





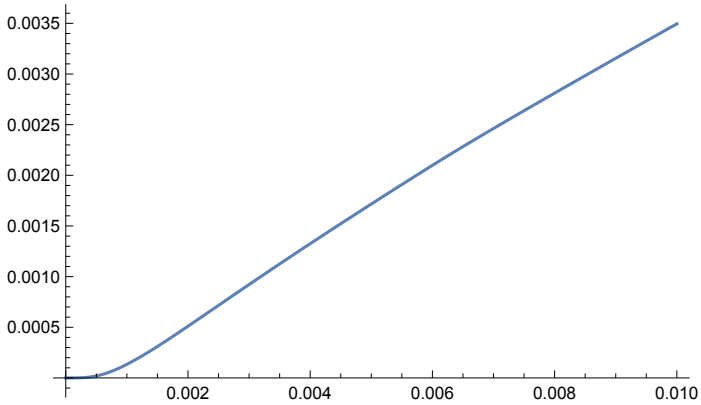
---------- C5

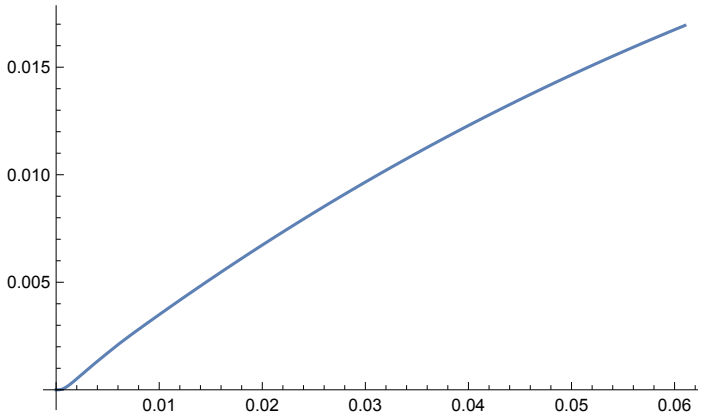
---------- C10

---------- D

---------- Ca = 0.758204

uM ----------





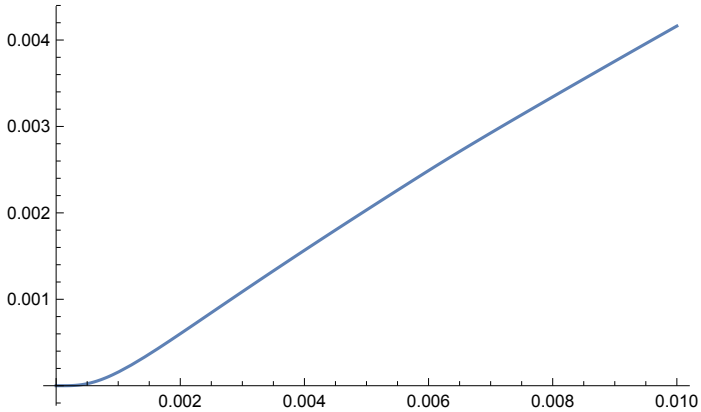
---------- C5

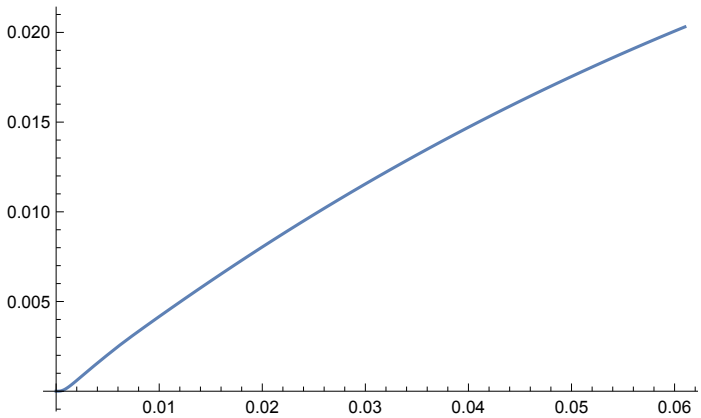
---------- C10

---------- D

---------- Ca = 0.788054

uM ----------





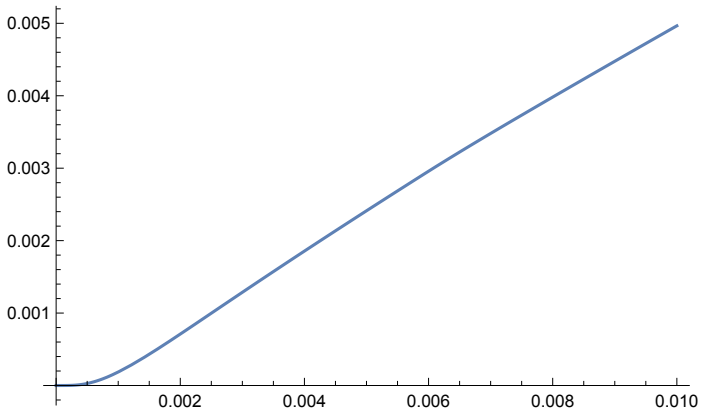
---------- C5

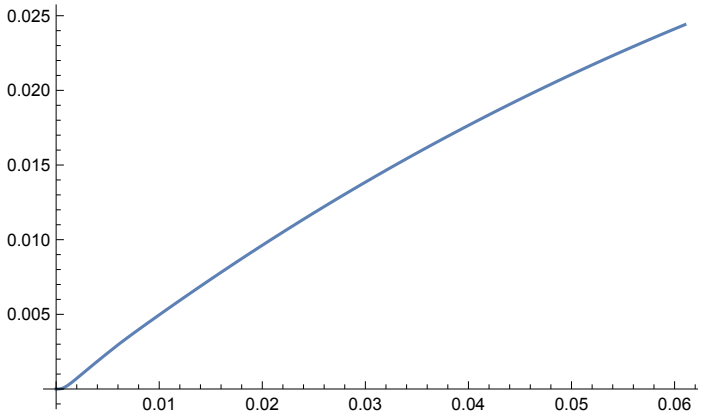
---------- C10

---------- D

---------- Ca = 0.820427

uM ----------





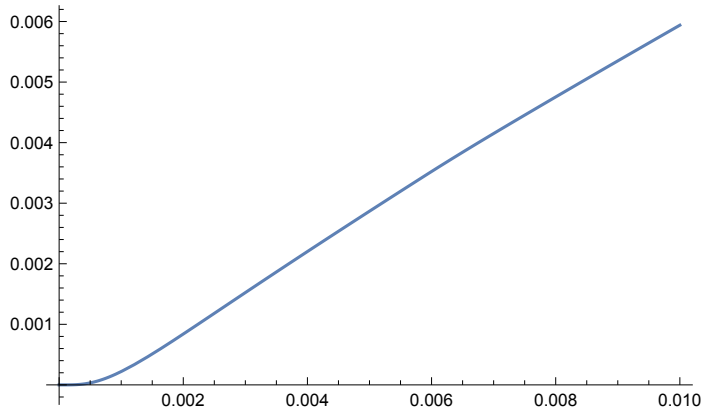
---------- C5

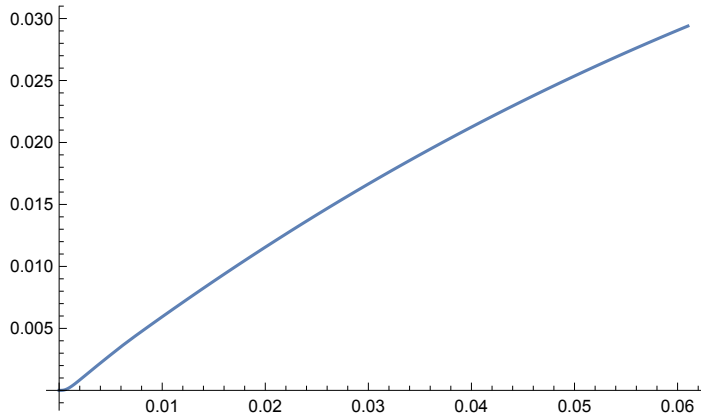
---------- C10

---------- D

---------- Ca = 0.854404

uM ----------





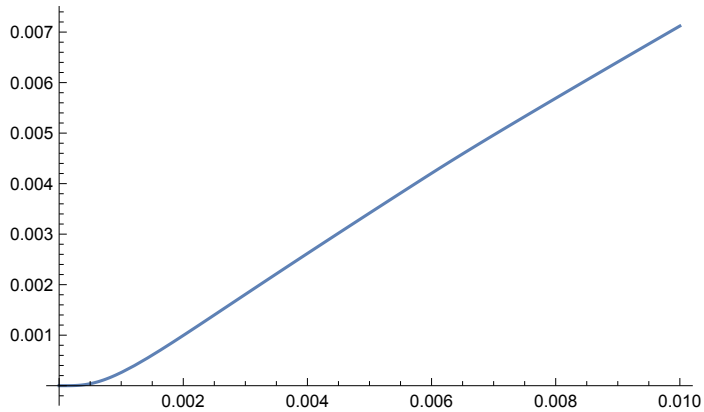
---------- C5

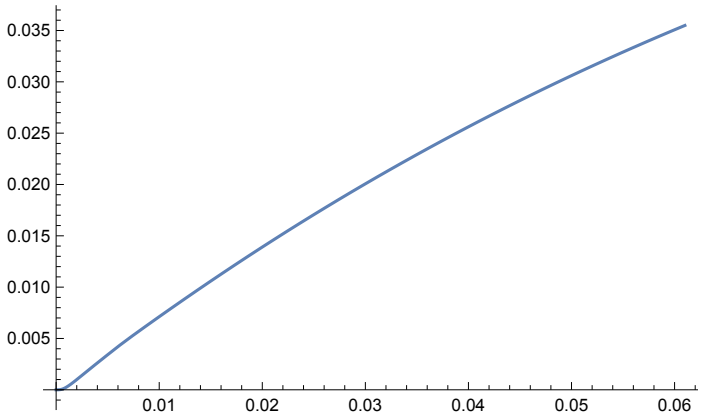
---------- C10

---------- D

---------- Ca = 0.890526

uM ----------





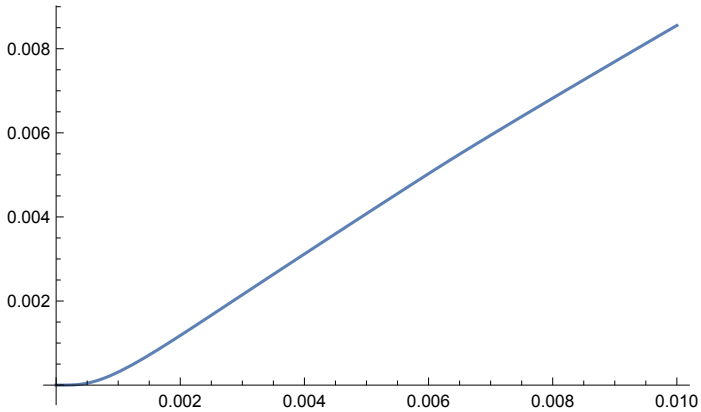
---------- C5

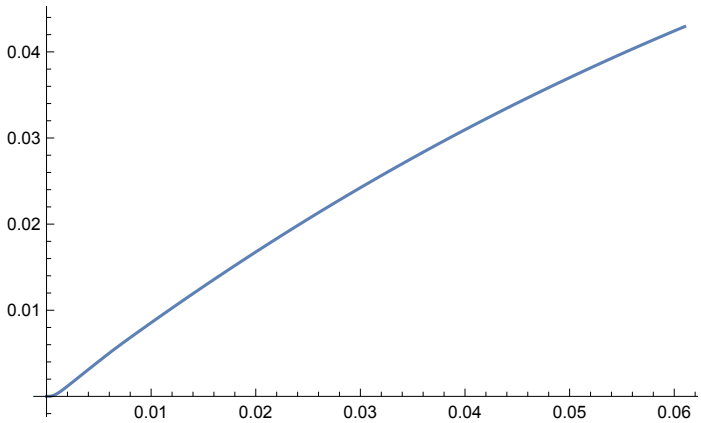
---------- C10

---------- D

---------- Ca = 0.928936

uM ----------



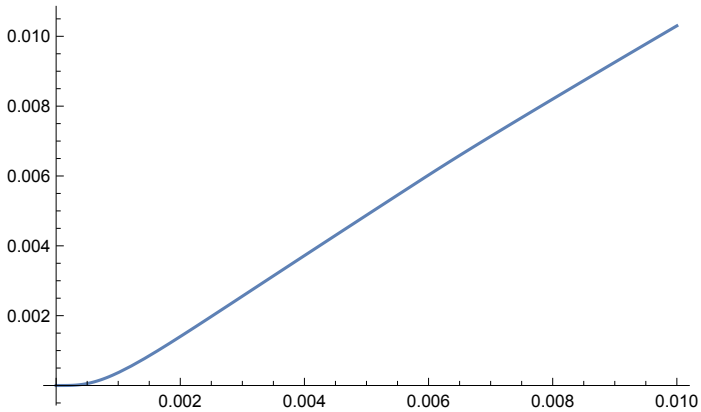


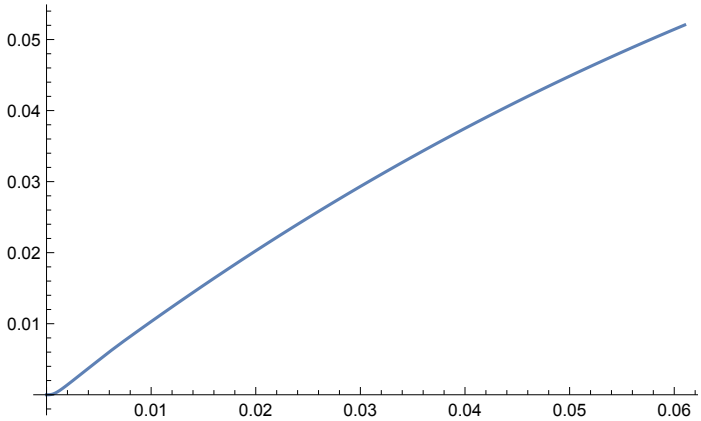
---------- C5

---------- C10

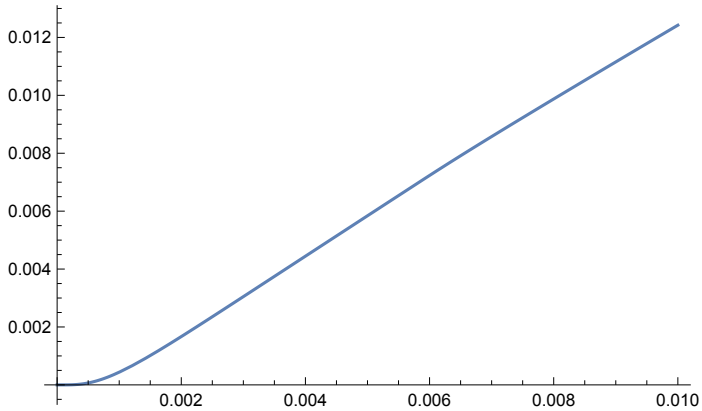
---------- D

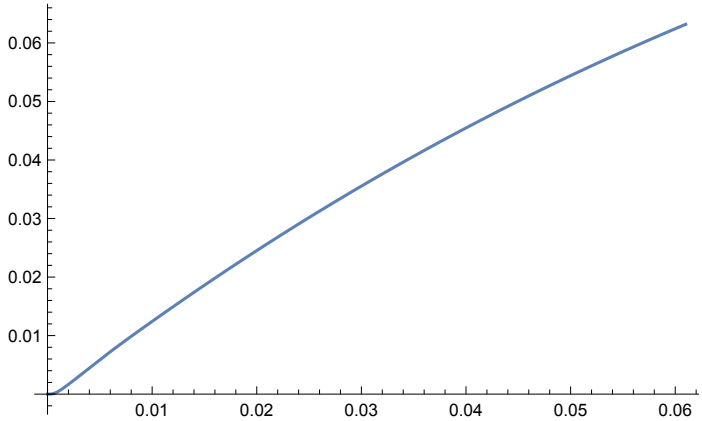
```
-------------------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 0.968962
  uM          -------------------------------------------------------
-------------------------------------------------------------------------------------------
  --------------------------
```






```
------------------------------------------------------------------------------ C5
------------------------------------------------------------------------------ C10
------------------------------------------------------------------------------ D
-------------------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 1.01226
  uM          -------------------------------------------------------
-------------------------------------------------------------------------------------------
  --------------------------
```





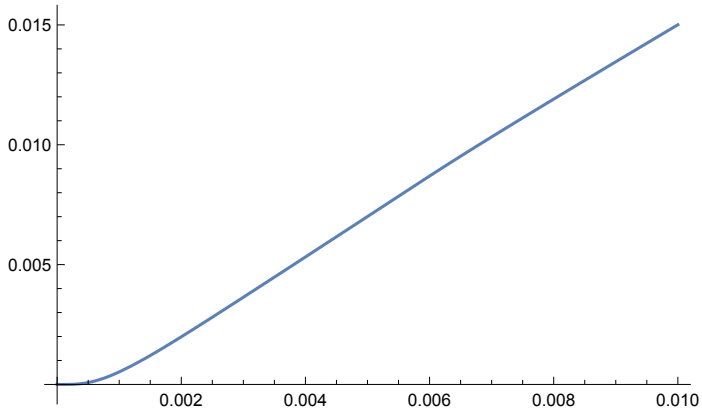
---------- C5

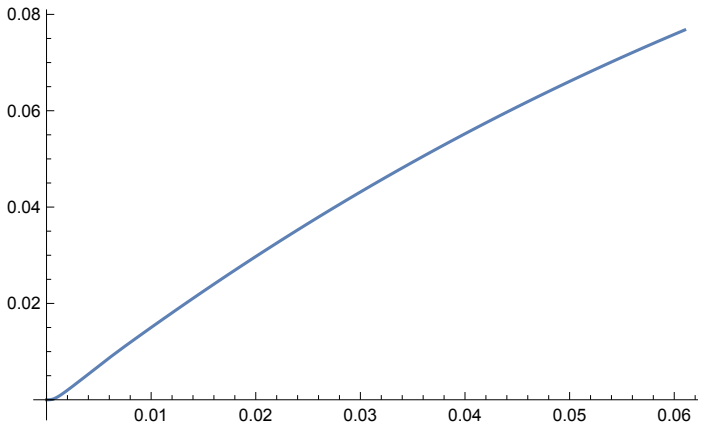
---------- C10

---------- D

---------- Ca = 1.05883

uM ----------





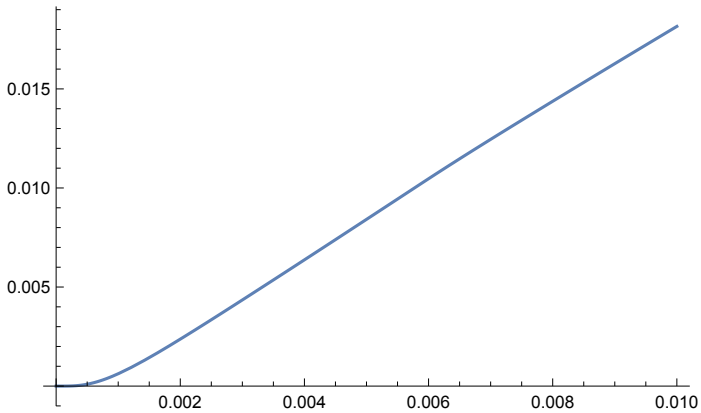
---------- C5

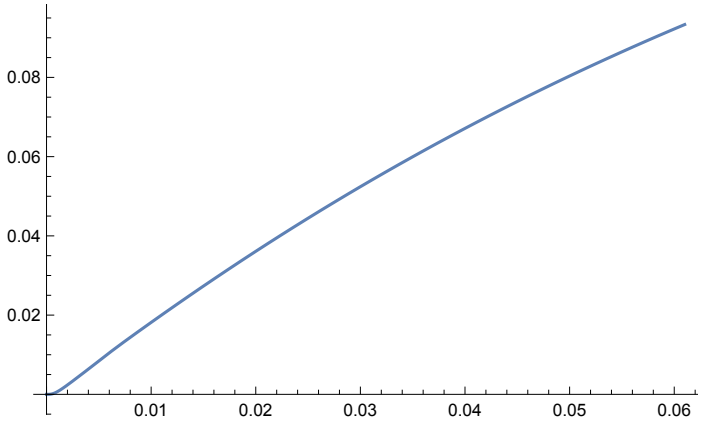
---------- C10

---------- D

---------- Ca = 1.10833

uM ----------





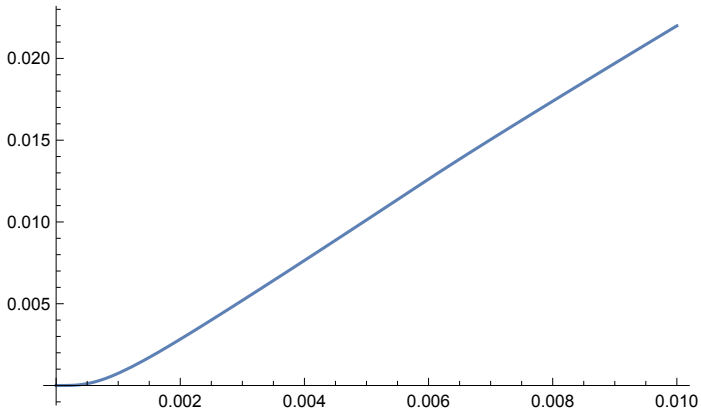
---------- C5

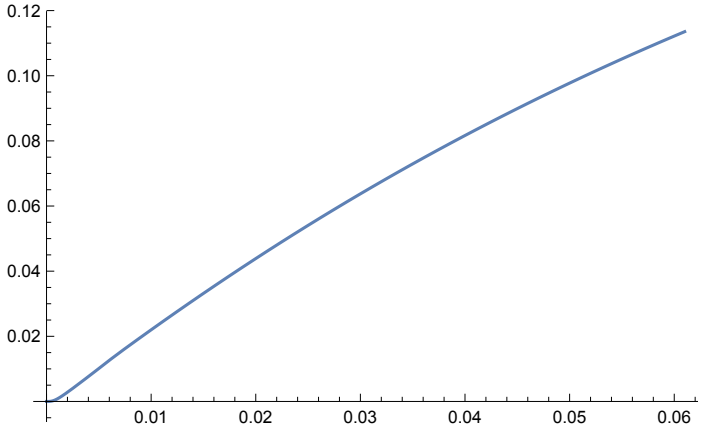
---------- C10

---------- D

---------- Ca = 1.16077

uM ----------





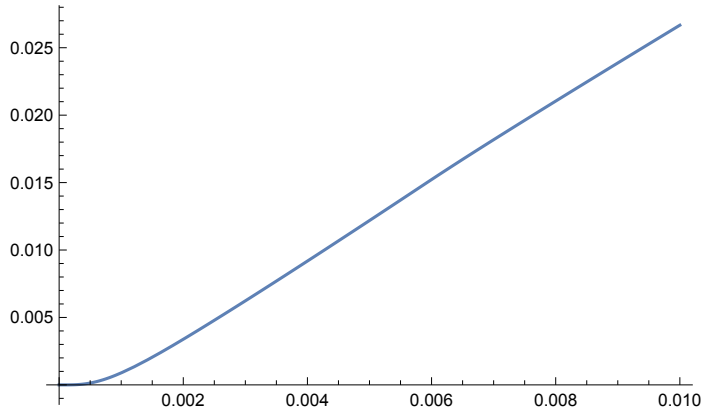
---------- C5

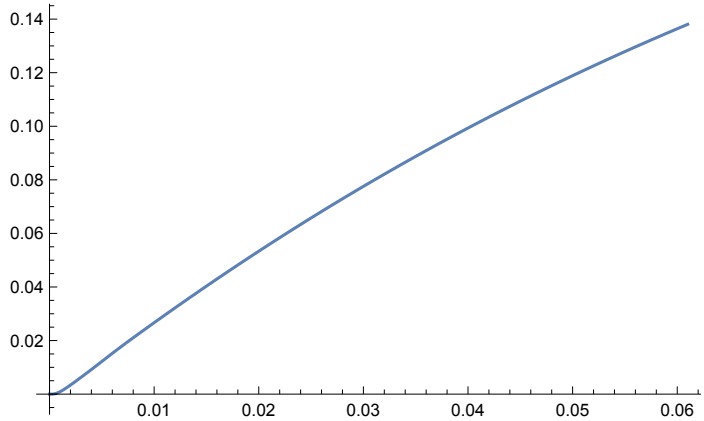
---------- C10

---------- D

---------- Ca = 1.21664

uM ----------





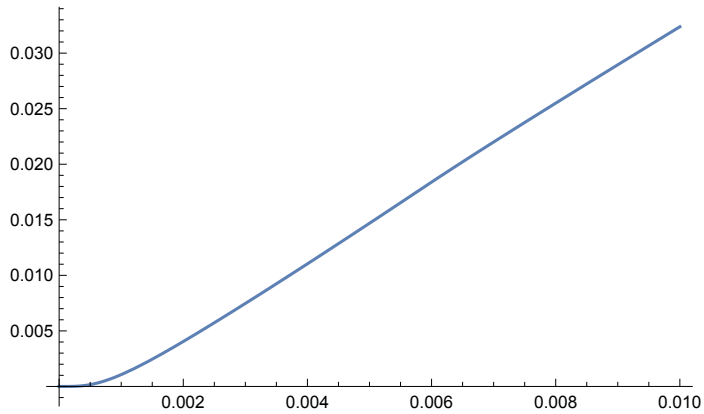
---------- C5

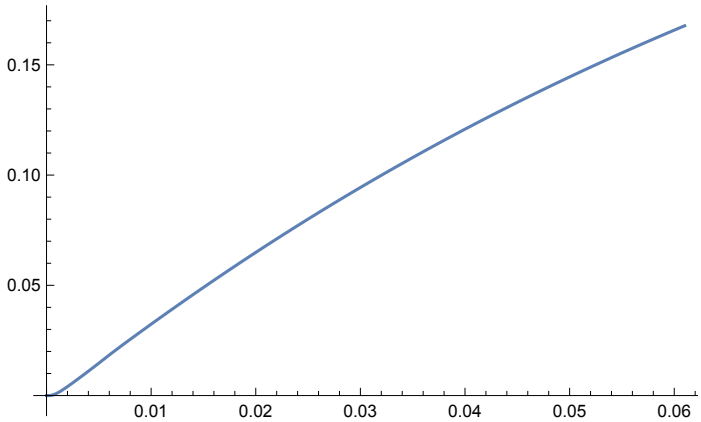
---------- C10

---------- D

---------- Ca = 1.27589

uM ----------





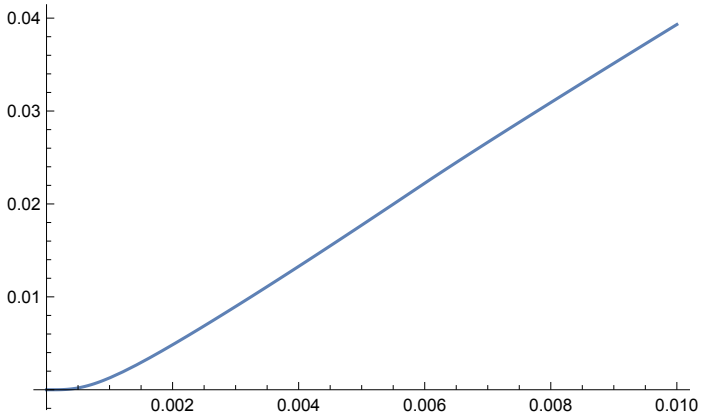
---------- C5

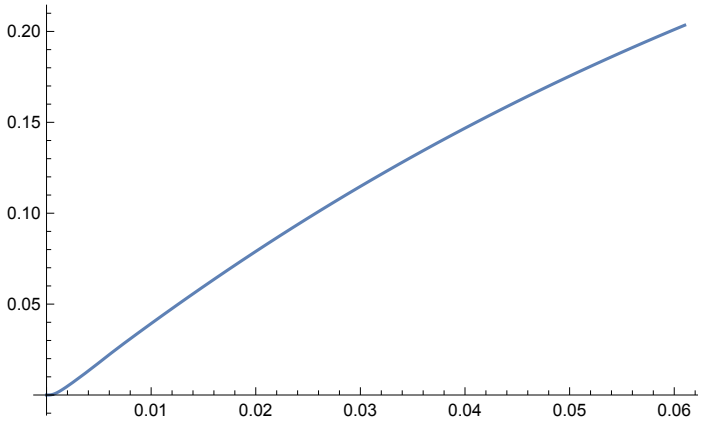
---------- C10

---------- D

---------- Ca = 1.33895

uM ----------





---------- C5

---------- C10

---------- D

NonlinearModelFit: Failed to converge to the requested accuracy or precision within 100 iterations.

```
take mono
```

```
take mono
```

NonlinearModelFit: The step size in the search has become less than the tolerance prescribed by the PrecisionGoal option, but the gradient is larger than the tolerance specified by the AccuracyGoal option. There is a possibility that the method has stalled at a point that is not a local minimum.

```
take mono
```

```
take mono
```

General: Exp[−738.255] is too small to represent as a normalized machine number; precision may be lost.

General: Exp[−796.748] is too small to represent as a normalized machine number; precision may be lost.

General: Exp[−855.241] is too small to represent as a normalized machine number; precision may be lost.

General: Further output of General::munfl will be suppressed during this calculation.

```
take mono
```

```
take mono
```

NonlinearModelFit: Failed to converge to the requested accuracy or precision within 100 iterations.

```
take mono
```

```
take mono
```

```
take mono
```

```
take mono
```

```
take mono
```

```
take mono
```

```
take mono
```

```
take mono
```

NonlinearModelFit: Failed to converge to the requested accuracy or precision within 100 iterations.

General: Further output of NonlinearModelFit::cvmit will be suppressed during this calculation.

```
take mono
```

```
take mono
```

```
take mono
```

```
take mono
```

```
take mono
```

```
take mono
```

```
take mono
```

```
take mono
```

```
take mono
```

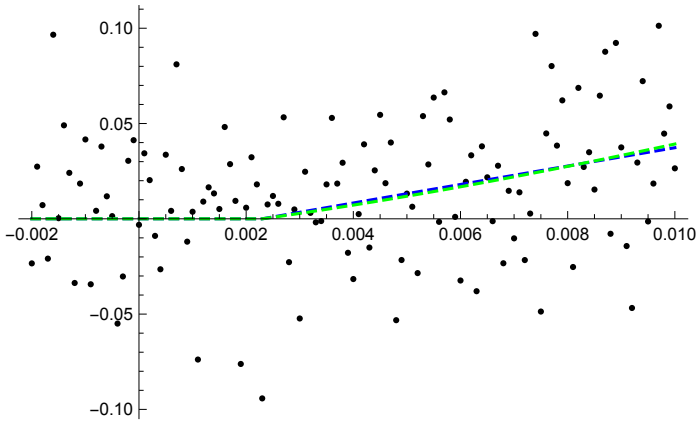
NonlinearModelFit: The step size in the search has become less than the tolerance prescribed by the PrecisionGoal option, but the gradient is larger than the tolerance specified by the AccuracyGoal option. There is a possibility that the method has stalled at a point that is not a local minimum.

```
take mono
take mono
take mono
take mono
```

NonlinearModelFit: The step size in the search has become less than the tolerance prescribed by the PrecisionGoal option, but the gradient is larger than the tolerance specified by the AccuracyGoal option. There is a possibility that the method has stalled at a point that is not a local minimum.

General: Further output of NonlinearModelFit::sszero will be suppressed during this calculation.

```
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
take mono
```




```
Mono: chi2 = 0.154522     d = 0.154522     a = 1.82929     t = 0.373724
Bi: ratio chi2Mono/chi2Bi = 1.00102     d = 0.0023     a =
 4.50633     a1 = -0.11719     t1 =0.0177874     t2 = 0.438919
```

Quantile: Argument {} should be a non−empty list.

Quantile: Argument {} should be a non−empty list.

Quantile: Argument {} should be a non−empty list.

General: Further output of Quantile::empt will be suppressed during this calculation.

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Long trace was used for fitting.
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FittedModel: The sum of squared errors is not a non−negative number. The model may suffer from significant numerical error or may not be appropriate for the data.

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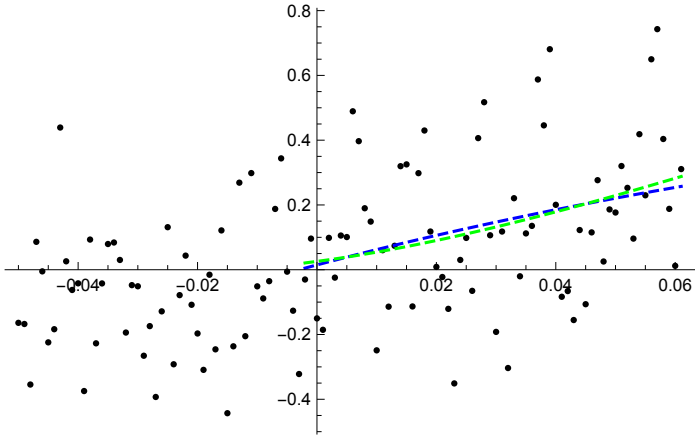
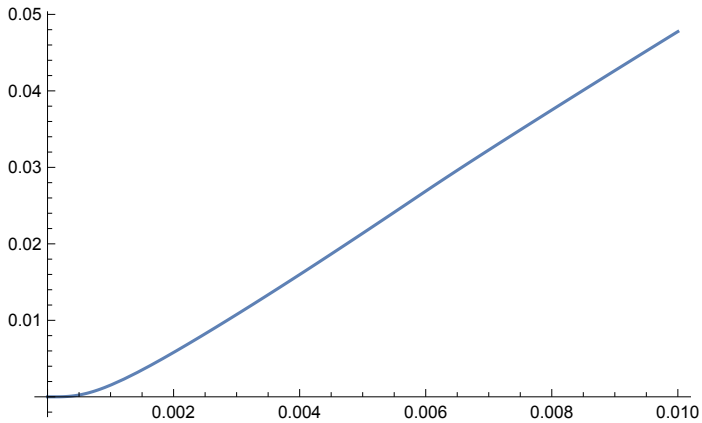
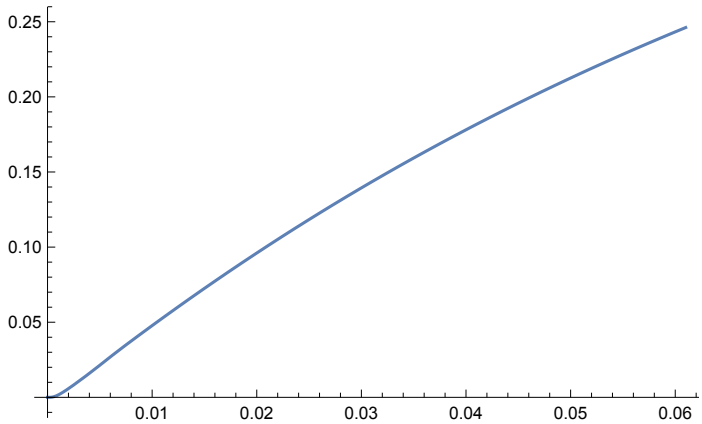



```
Mono: chi2 = 5.37106     d = -0.003     a = 0.707561     t = 0.141638
Bi: ratio chi2Mono/chi2Bi = 1.00505     d = -0.015     a =
 2.74834     a1 = -0.725522     t1 =0.0682548     t2 = 0.301016
-------------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 1.40597
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
  --------------------------
```



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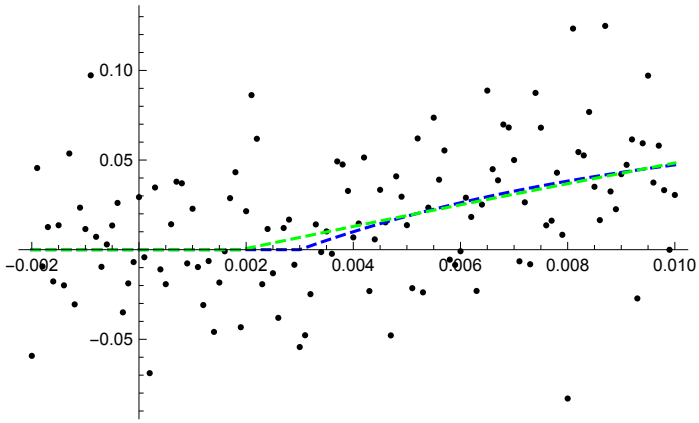


```
Mono: chi2 = 0.148603     d = 0.148603     a = 0.0742741     t = 0.00690685
Bi: ratio chi2Mono/chi2Bi = 0.990362     d = 0.0019     a =
 0.493234     a1 = 0.580659     t1 =0.0915785     t2 = 0.891312
Long trace was used for fitting.
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LinearAlgebra`BLAS`TRSV: Machine overflow encountered during computations.

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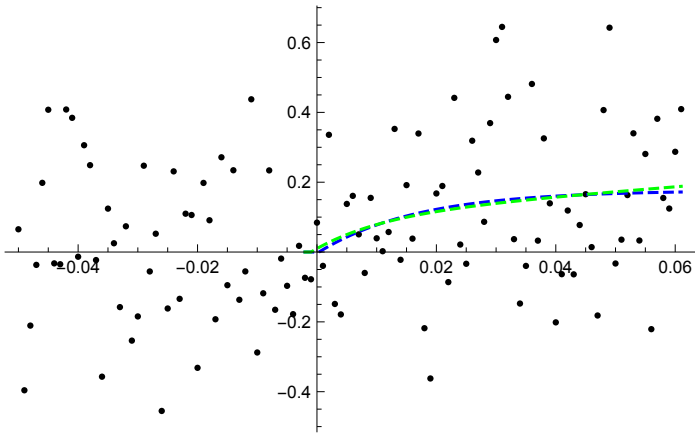


```
Mono: chi2 = 5.23555     d = 0.000342074     a = 0.176564     t = 0.0166671
Bi: ratio chi2Mono/chi2Bi = 0.999806     d = -0.001     a =
 4.41098     a1 = 0.104613     t1 =0.0117392     t2 = 3.14485
--------------------------------------------------------------------------------
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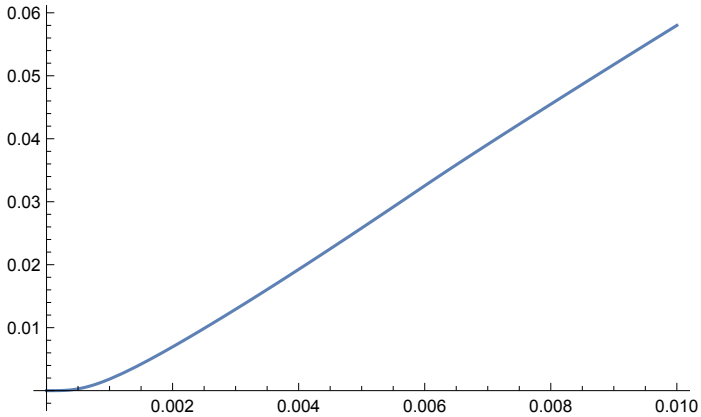
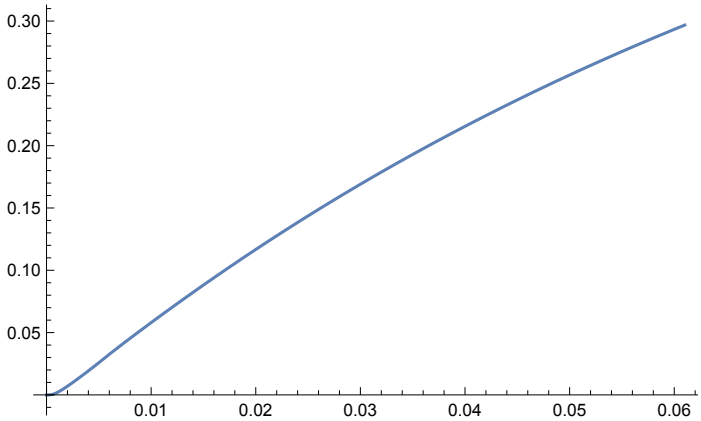
```

---------- Ca = 1.47745

uM ----------





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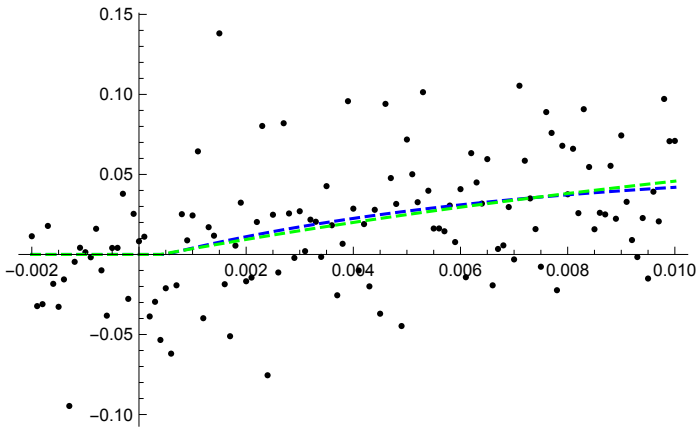


```
Mono: chi2 = 0.156419     d = 0.156419     a = 0.0553371     t = 0.00669579

Bi: ratio chi2Mono/chi2Bi = 0.997632     d = 0.0004     a =
 0.343212     a1 = 0.0900174     t1 =0.0162751     t2 = 0.422969

Long trace was used for fitting.

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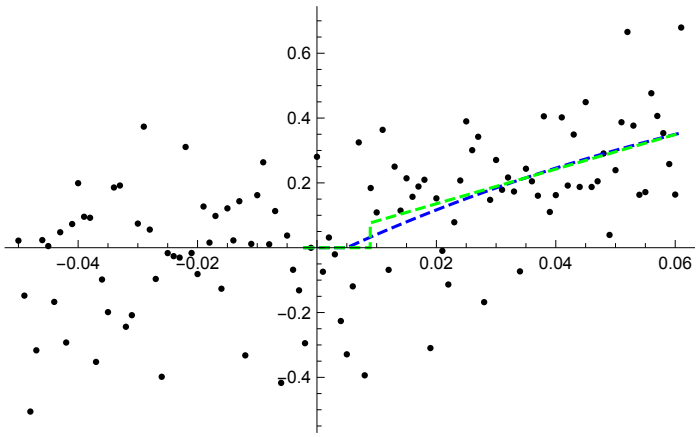
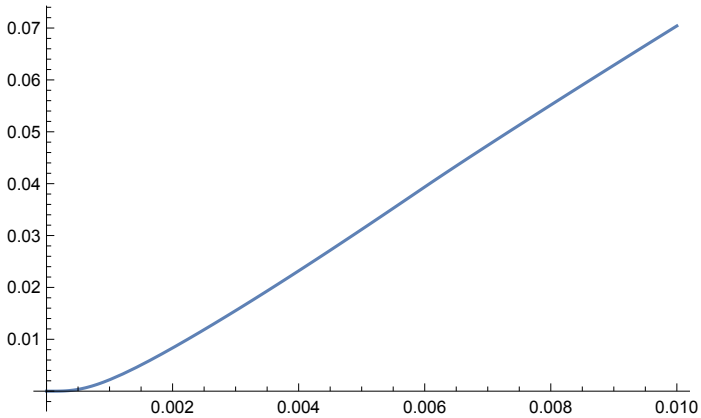


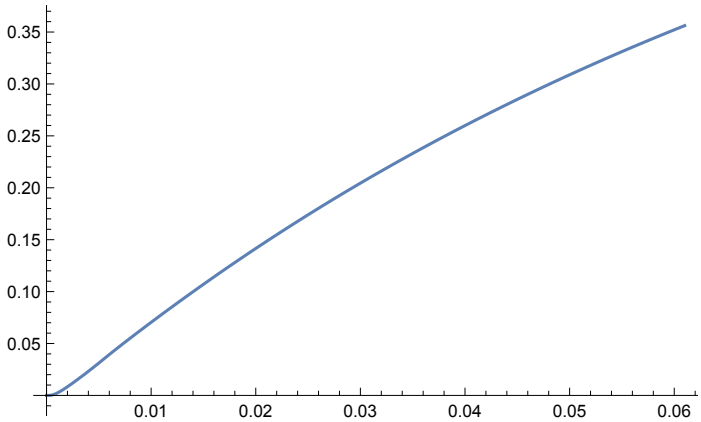
Mono: chi2 = 3.8092 d = 0.005 a = 0.787721 t = 0.0936693

Bi: ratio chi2Mono/chi2Bi = 1.01238 d = 0.00892402 a = 360.129 a1 = 0.0764732 t1 = 1.84799×10^{-6} t2 = 67.3968

---------- Ca = 1.55324

uM ----------





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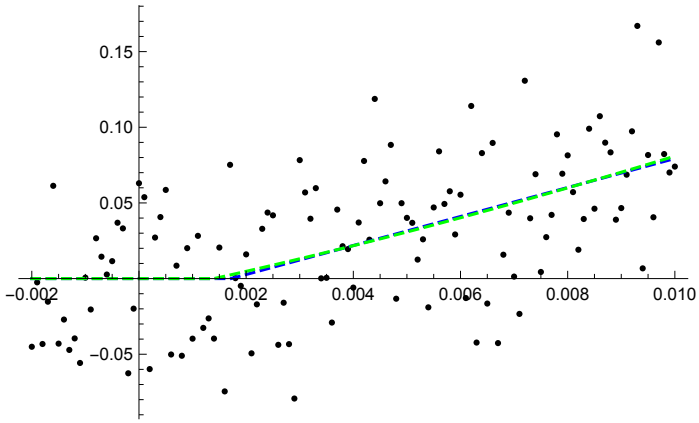


```
Mono: chi2 = 0.207076     d = 0.207076     a = 761306.     t = 79486.7
Bi: ratio chi2Mono/chi2Bi = 1.00096     d = 0.0014     a =
 -1.29481     a1 = -0.0464631     t1 =0.0121607     t2 = -0.107019
Long trace was used for fitting.
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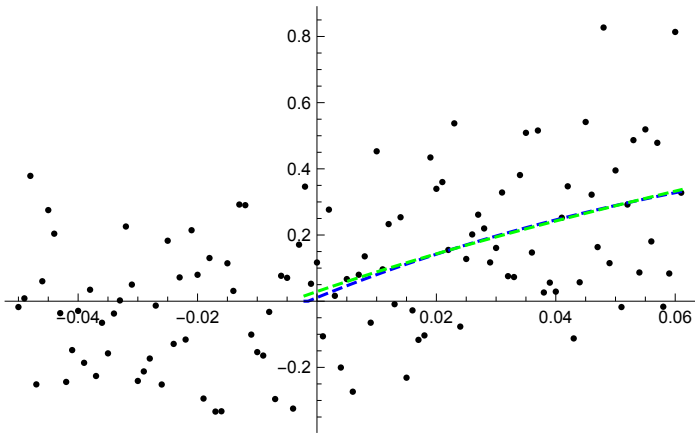
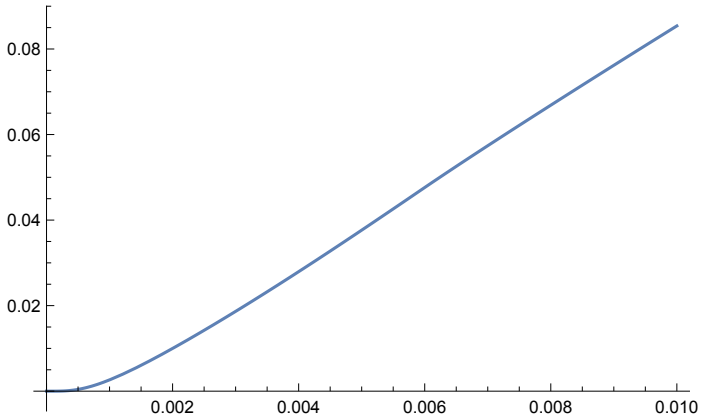
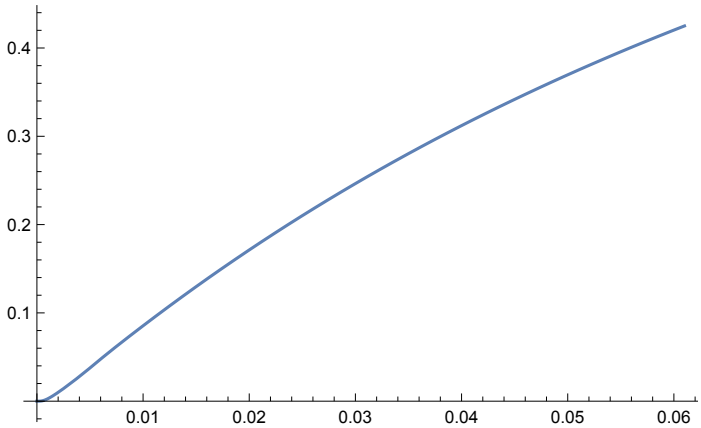



```
Mono: chi2 = 4.60756     d = -0.00147795     a = 0.640443     t = 0.0856902
Bi: ratio chi2Mono/chi2Bi = 1.00209     d = -0.00459776
      a = 7.89893     a1 = 0.0966002     t1 =0.0389509     t2 = 1.9482
-------------------------------------------------------------------------------------
  --------------------------
```

---------- Ca = 1.63202
uM ----------





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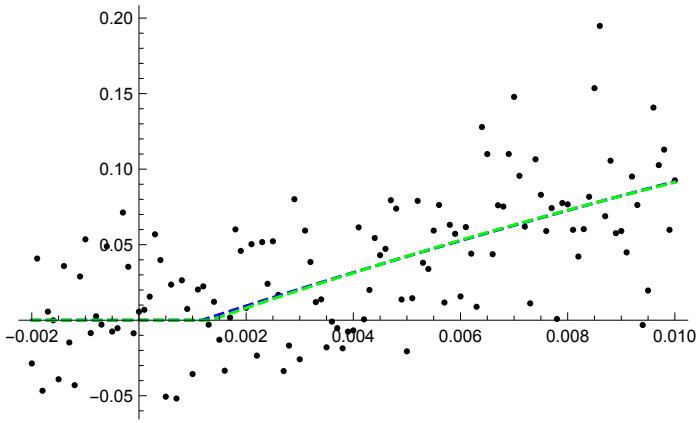


```
Mono: chi2 = 0.157576     d = 0.157576     a = 0.469114     t = 0.0405215
Bi: ratio chi2Mono/chi2Bi = 1.00024     d = 0.00134183     a =
 0.191844     a1 = 0.543372     t1 =0.0315822     t2 = 0.0736206
Long trace was used for fitting.
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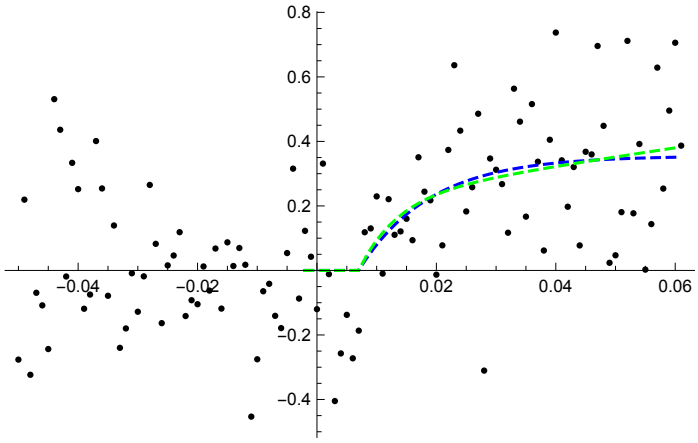


```
Mono: chi2 = 4.68161     d = 0.00696843     a = 0.355041     t = 0.0119109
Bi: ratio chi2Mono/chi2Bi = 1.00199     d = 0.007     a =
 2.09085     a1 = 0.225543     t1 =0.00642337     t2 = 0.612807
--------------------------------------------------------------------------------
  -------------------------
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```
----------------     Ca = 1.71772
  uM          -------------------------------------------------------
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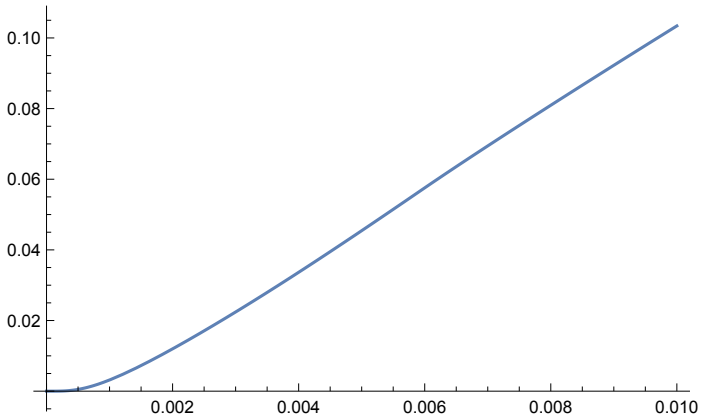

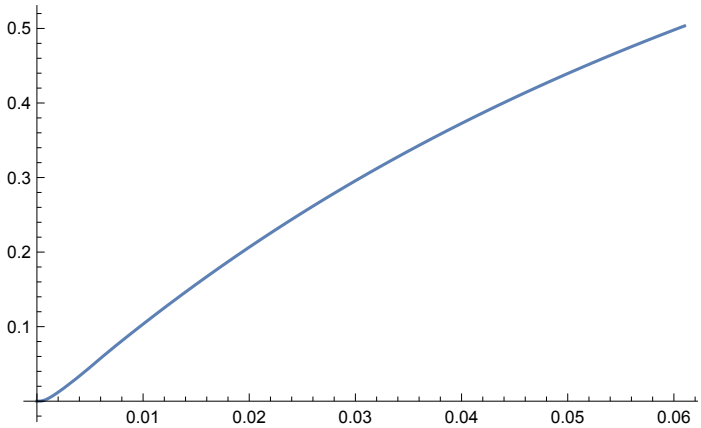


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LinearAlgebra`BLAS`TRSV: Machine overflow encountered during computations.

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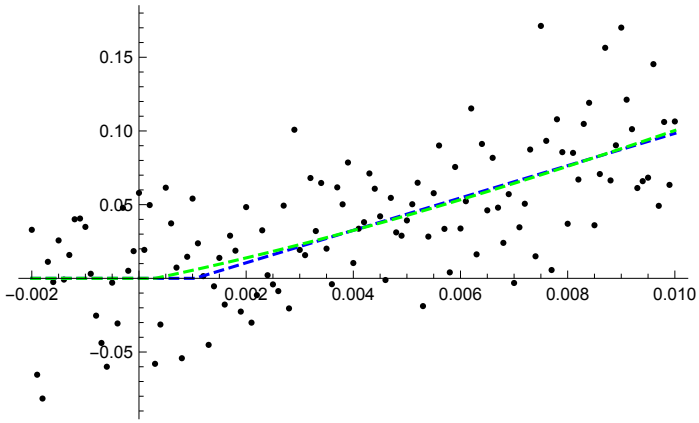


```
Mono: chi2 = 0.154058     d = 0.154058     a = 8.38577     t = 0.758916
Bi: ratio chi2Mono/chi2Bi = 1.00147     d = 0.0003     a =
 2.17898     a1 = -0.316638     t1 =0.0181067     t2 = 0.0995706
Long trace was used for fitting.
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FittedModel: The sum of squared errors is not a non−negative number. The model may suffer from significant numerical error or may not be appropriate for the data.

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take mono
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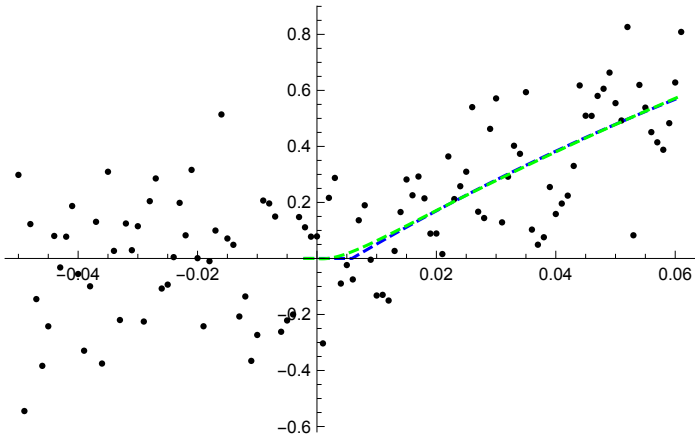

Mono: chi2 = 4.19866 d = 0.00586996 a = 1.79011 t = 0.141717

Bi: ratio chi2Mono/chi2Bi = 0.999396 d = 2.54421×10^{-14} a = 2.58491 a1 = −0.0585649 t1 =0.00394115 t2 = 0.220283

```
-------------------------------------------------------------------------------------------
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----------------     Ca = 1.81058
  uM          -------------------------------------------------------
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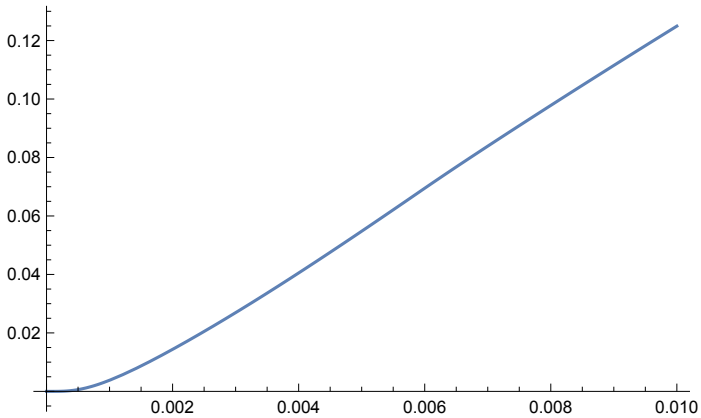
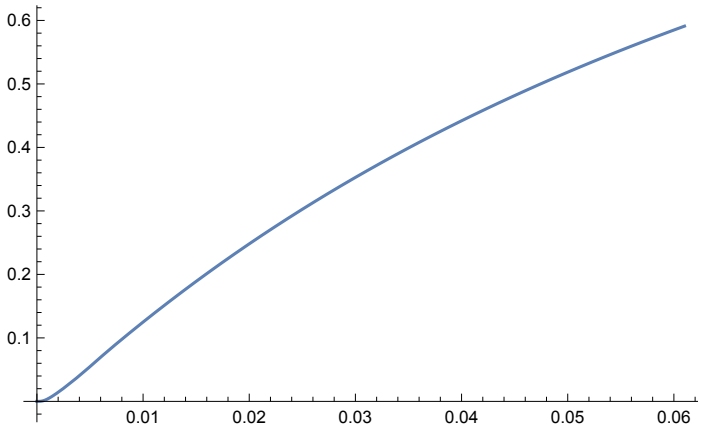
```



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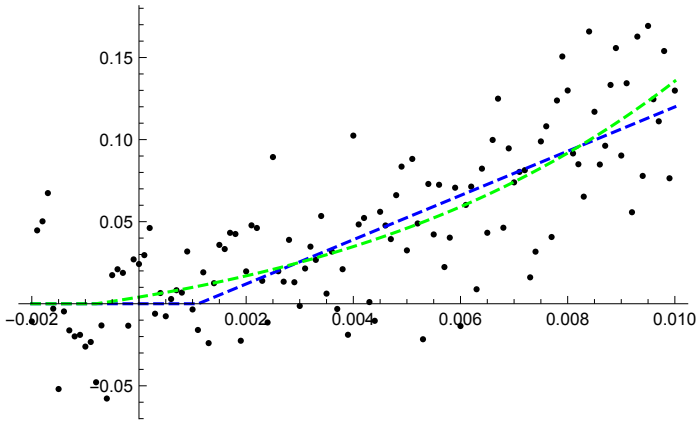

Mono: chi2 = 0.125308 d = 0.125308 a = 5.12624×10^6 t = 380 157.

Bi: ratio chi2Mono/chi2Bi = 1.04757 d = -0.0008 a = -0.0496404 a1 = -0.0106462 t1 =0.0131129 t2 = -0.00704482

Long trace was used for fitting.

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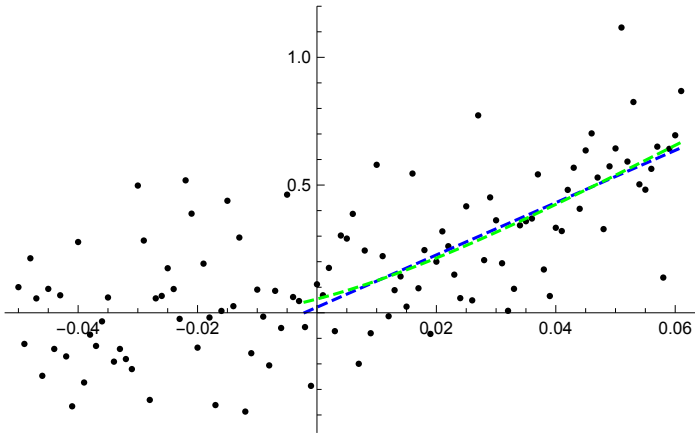

Mono: chi2 = 5.11982 d = -0.00212542 a = 3.76455×10^{7} t = 3.67843×10^{6}

Bi: ratio chi2Mono/chi2Bi = 1.00912 d = -0.012 a = 3.79137 a1 = -0.780534 t1 =0.0423461 t2 = 0.216467

```
----------------     Ca = 1.90732
  uM          -------------------------------------------------------
-----------------------------------------------------------------------------------------
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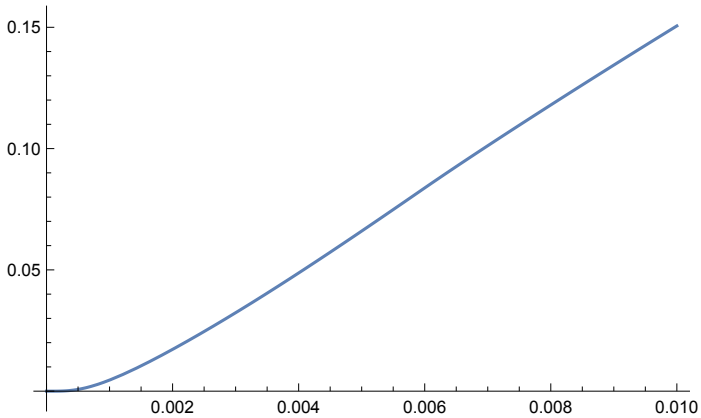
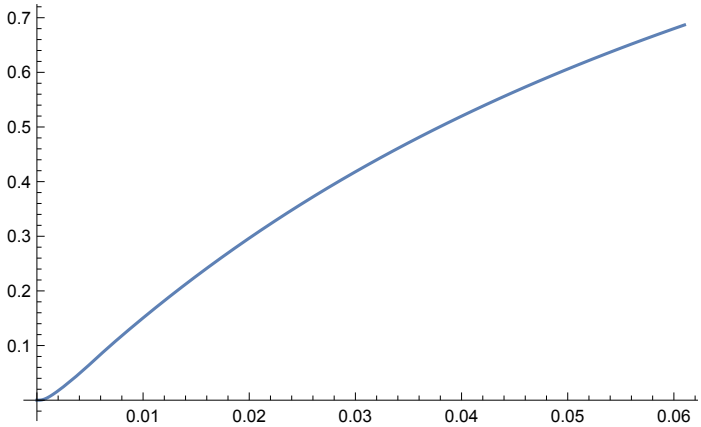
```



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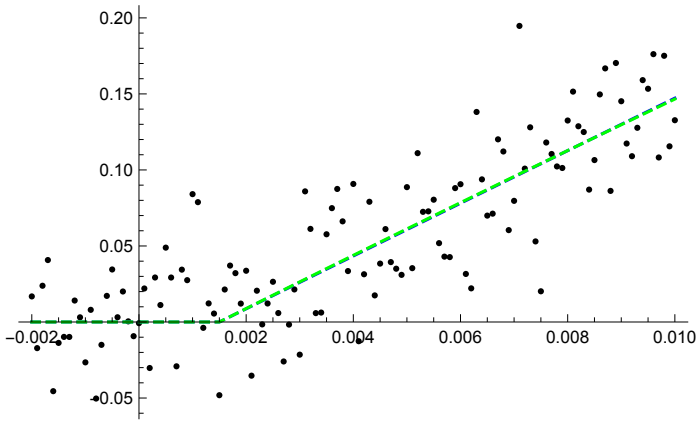


```
Mono: chi2 = 0.120491     d = 0.120491     a = 16.115     t = 0.926291

Bi: ratio chi2Mono/chi2Bi = 0.999355     d = 0.0015     a =
 3.98345     a1 = 0.145283     t1 =0.0600233     t2 = 0.251741

Long trace was used for fitting.

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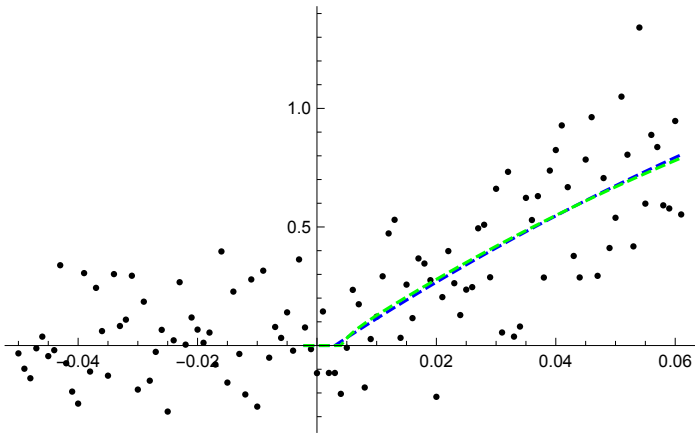


```
Mono: chi2 = 4.78373     d = 0.003     a = 2.61152     t = 0.15749
Bi: ratio chi2Mono/chi2Bi = 1.00152     d = 0.004     a =
 2.19704     a1 = 0.031847     t1 =0.00163663     t2 = 0.132026
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----------------     Ca = 2.01009
  uM          -------------------------------------------------------
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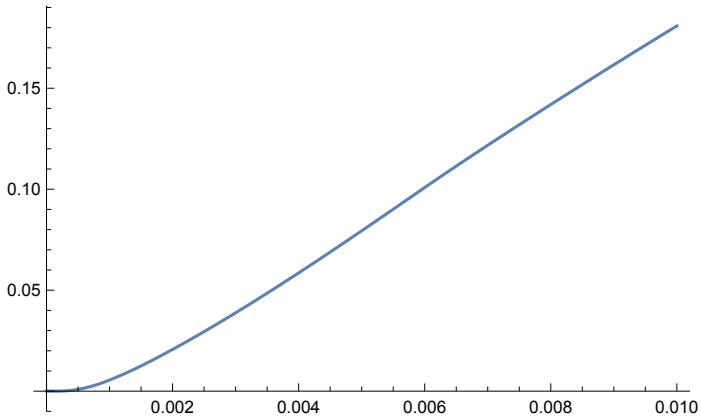

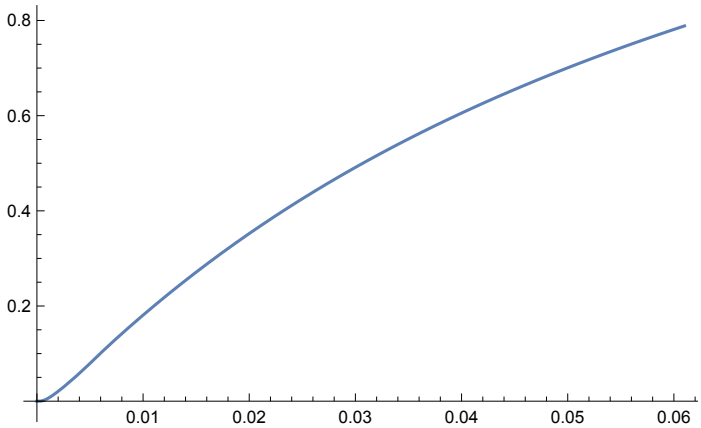


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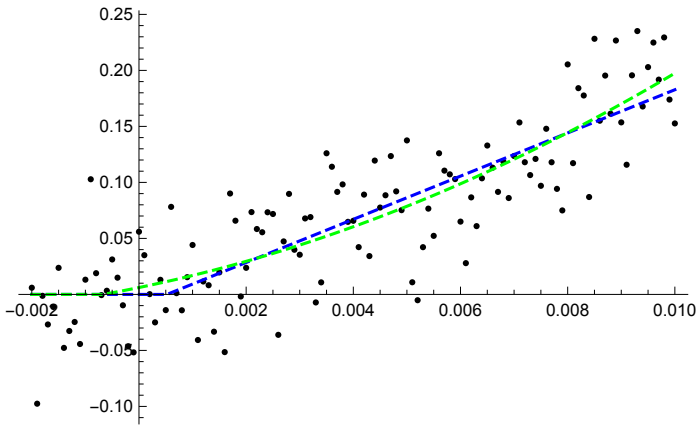

Mono: chi2 = 0.184953 d = 0.184953 a = 3.06725×10^6 t = 159 112.

Bi: ratio chi2Mono/chi2Bi = 1.02655 d = −0.000668512

a = 432.529 a1 = −5067.82 t1 =0.454191 t2 = 0.492578

Long trace was used for fitting.

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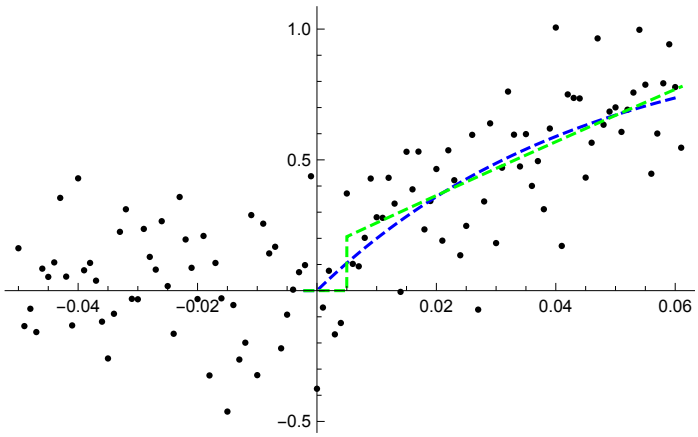

Mono: chi2 = 4.33822 d = 2.95235×10^{-19} a = 1.00035 t = 0.0449689

Bi: ratio chi2Mono/chi2Bi = 1.03345 d = 0.005 a = 8.9776 a1 = 0.206382 t1 = 5.24764×10^{-12} t2 = 0.828592

```
----------------     Ca = 2.11924
  uM          -------------------------------------------------------
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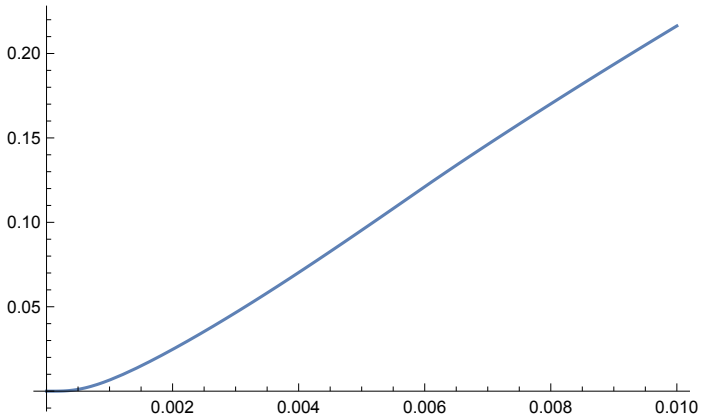

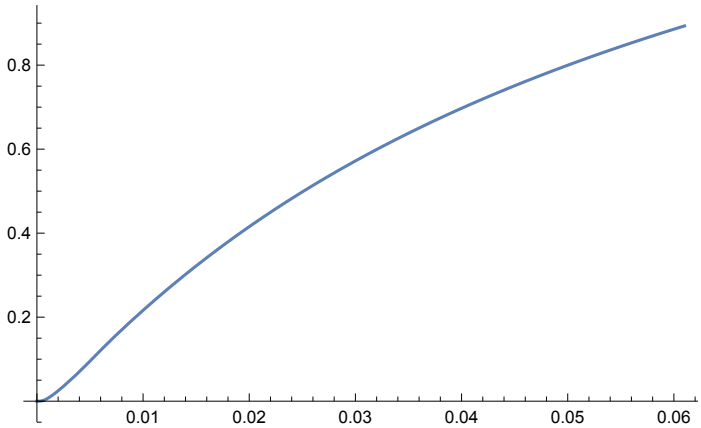


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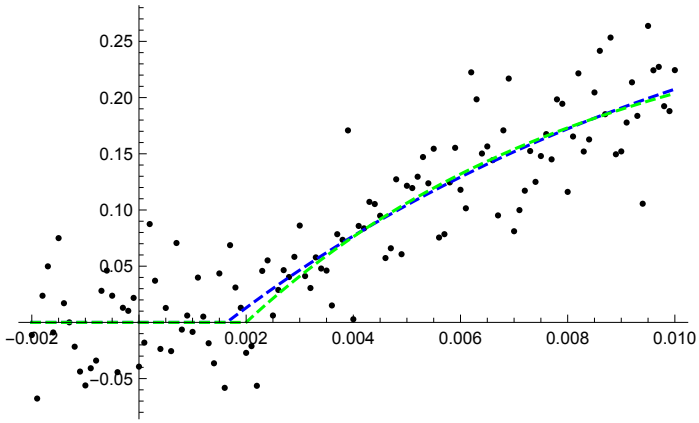


```
Mono: chi2 = 0.170601     d = 0.170601     a = 0.368048     t = 0.0100804
Bi: ratio chi2Mono/chi2Bi = 1.00522     d = 0.002     a =
 1.44627     a1 = 0.255561     t1 =0.00602617     t2 = 0.593655
Long trace was used for fitting.
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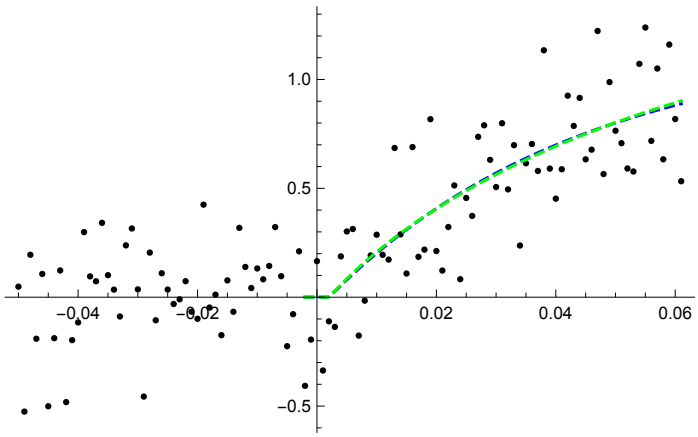


```
Mono: chi2 = 5.45858     d = 0.002     a = 1.18964     t = 0.0429373
Bi: ratio chi2Mono/chi2Bi = 0.99938     d = 0.002     a =
 1.38785     a1 = 0.0712738     t1 =0.00908561     t2 = 0.0592363
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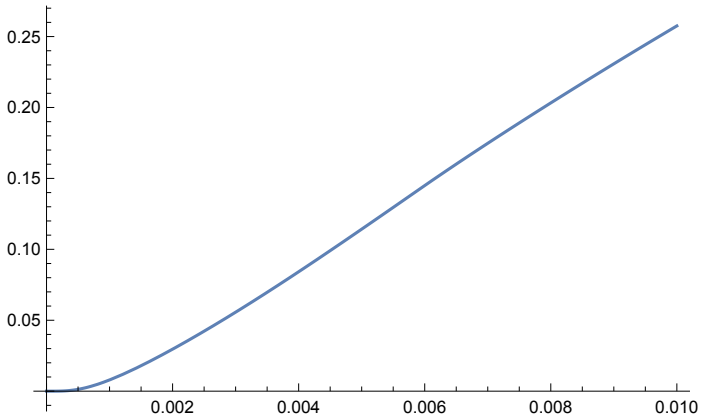
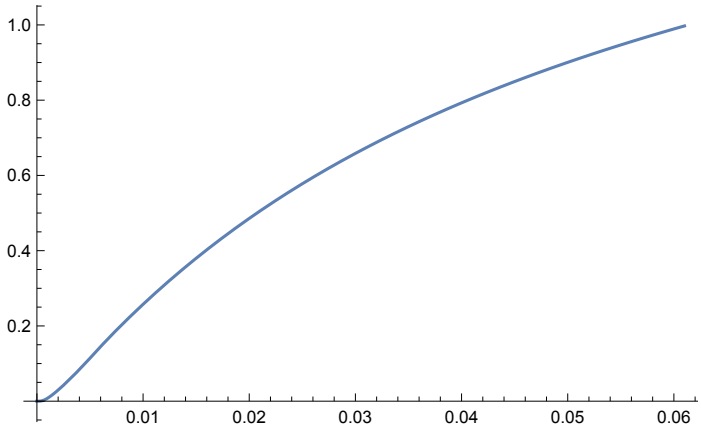
```

---------- Ca = 2.23489
uM ----------





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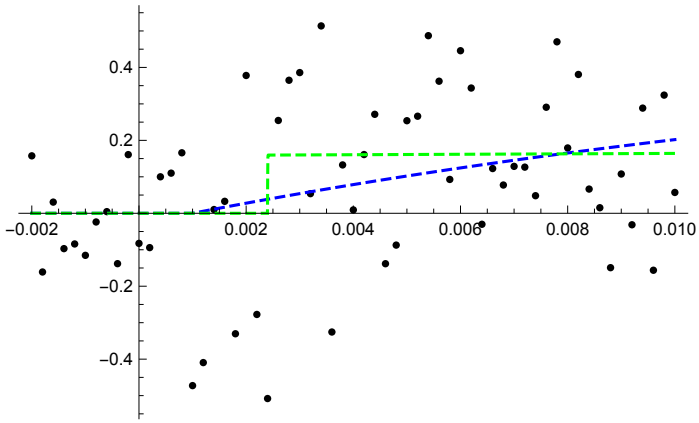

Mono: chi2 = 2.94922 d = 2.94922 a = 0.517426 t = 0.0181808

Bi: ratio chi2Mono/chi2Bi = 1.10777 d = 0.0024 a = 0.334573 a1 = 0.159627 t1 = 1.87961×10^{-6} t2 = 0.286327

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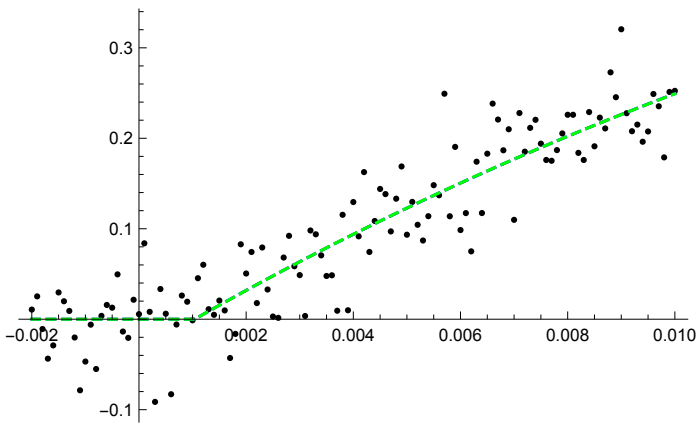


```
Mono: chi2 = 0.174136     d = 0.174136     a = 0.743947     t = 0.0219522
Bi: ratio chi2Mono/chi2Bi = 1.00014     d = 0.00104253     a =
 0.406346     a1 = 1.36777     t1 =0.0277598     t2 = 0.0626458
Long trace was used for fitting.
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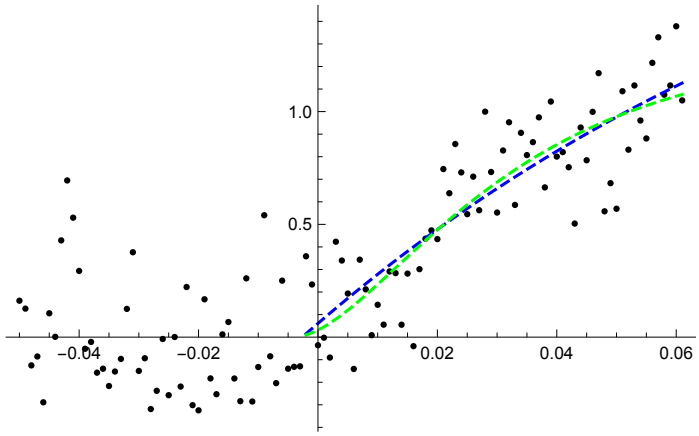


```
Mono: chi2 = 5.34      d = -0.00263237      a = 2.55039      t = 0.109161
Bi: ratio chi2Mono/chi2Bi = 1.01315      d = -0.00433826      a =
 1.29068      a1 = -0.869653      t1 =0.0114703      t2 = 0.0284841
--------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 2.35773
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```

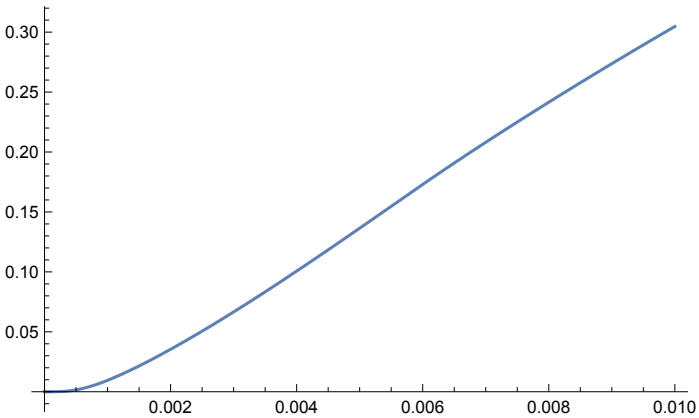

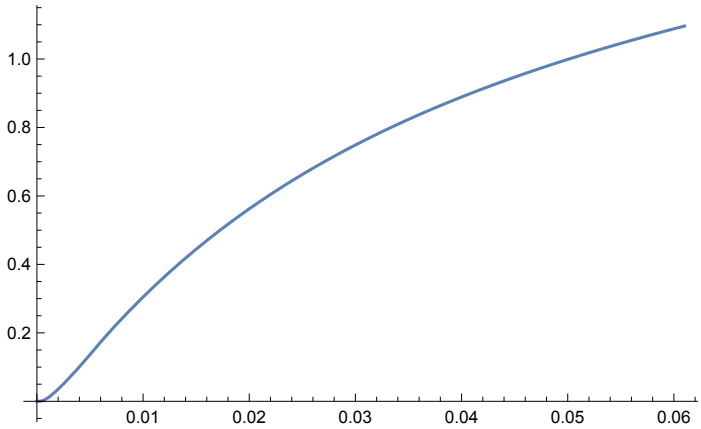

---------- C5

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LinearAlgebra`BLAS`TRSV: Machine overflow encountered during computations.

General: Further output of LinearAlgebra`BLAS`TRSV::oflow will be suppressed during this calculation.

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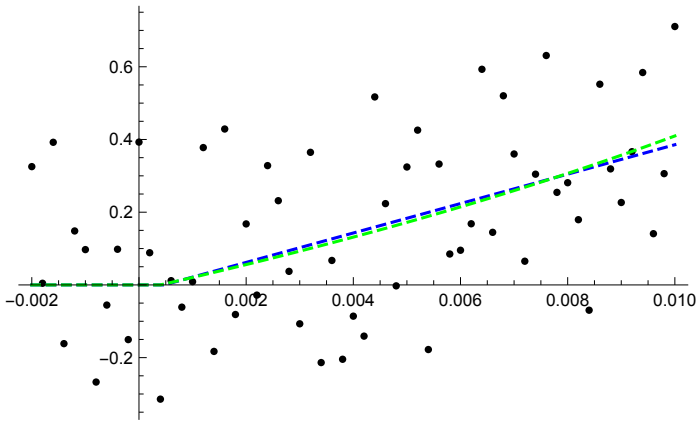

Mono: chi2 = 2.86572 d = 2.86572 a = 1.13281×10^{7} t = 280 020.

Bi: ratio chi2Mono/chi2Bi = 1.0041 d = 0.0004 a = 0.514519 a1 = 0.75367 t1 =0.0524484 t2 = -0.0122756

Long trace was used for fitting.

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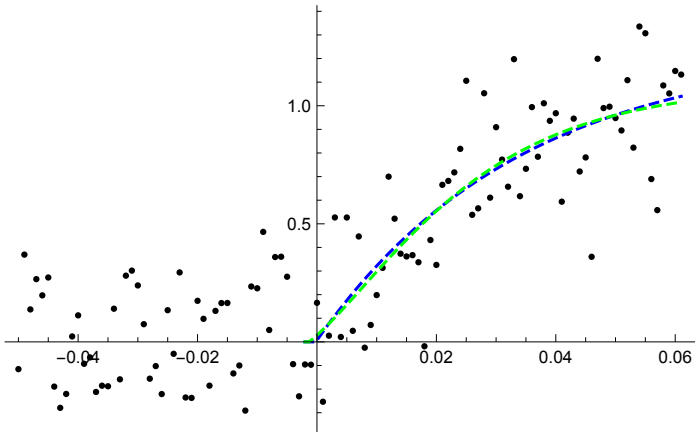

Mono: chi2 = 5.28943 d = -0.000184831 a = 1.24804 t = 0.0341667

Bi: ratio chi2Mono/chi2Bi = 1.0037 d = -0.00131821 a = 1.08316 a1 = -7.60571 t1 =0.0142881 t2 = 0.0157248

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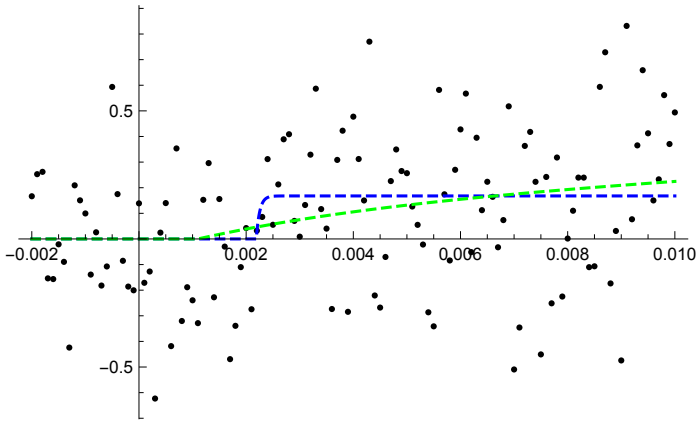


```
Mono: chi2 = 9.67597     d = 9.67597     a = 0.167912     t = 0.0000640208
Bi: ratio chi2Mono/chi2Bi = 0.979605     d = 0.0011     a =
 1.28919     a1 = 0.133507     t1 =0.00384063     t2 = 0.0942585
Long trace was used for fitting.
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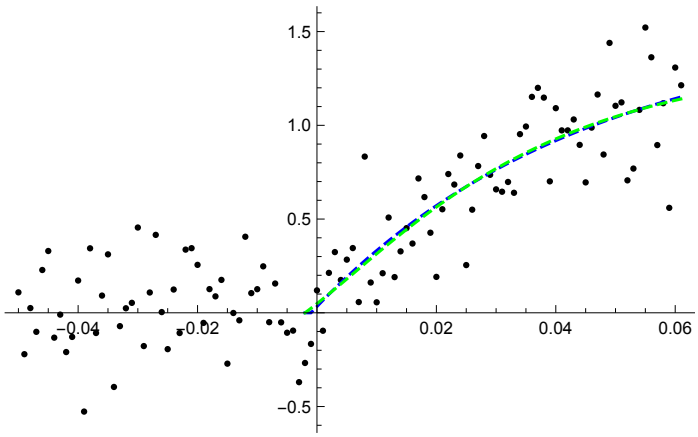


```
Mono: chi2 = 5.28758     d = -0.001     a = 1.54958     t = 0.0456418
Bi: ratio chi2Mono/chi2Bi = 1.00251     d = -0.002     a =
 1.35703     a1 = -0.497676     t1 =0.0126954     t2 = 0.0295474
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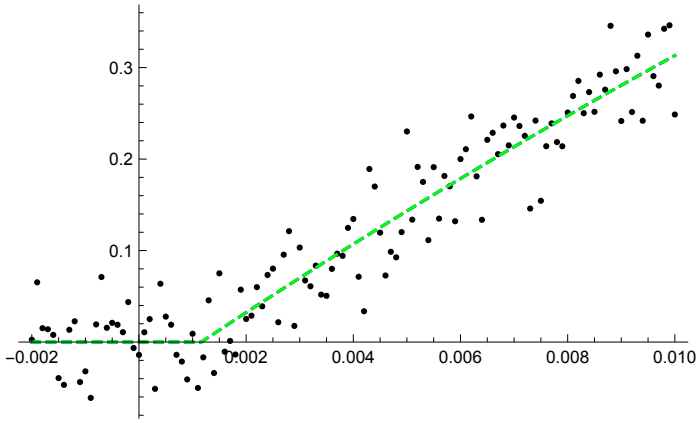


```
Mono: chi2 = 0.151784     d = 0.151784     a = 1.81878     t = 0.0467723
Bi: ratio chi2Mono/chi2Bi = 0.99999     d = 0.00116291     a =
 -1.30821     a1 = 1.34497     t1 =0.0396702     t2 = -0.530623
Long trace was used for fitting.
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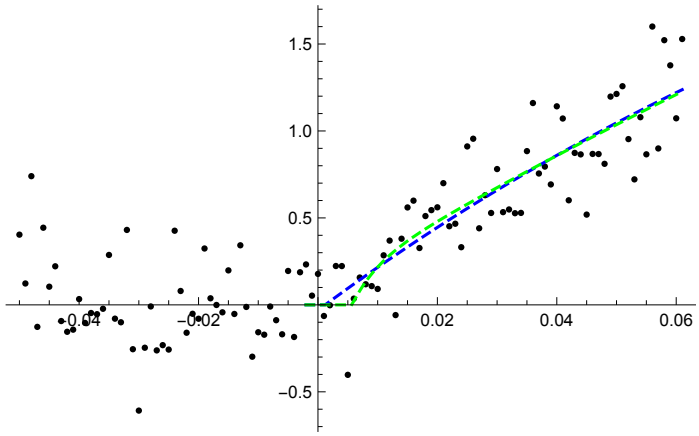
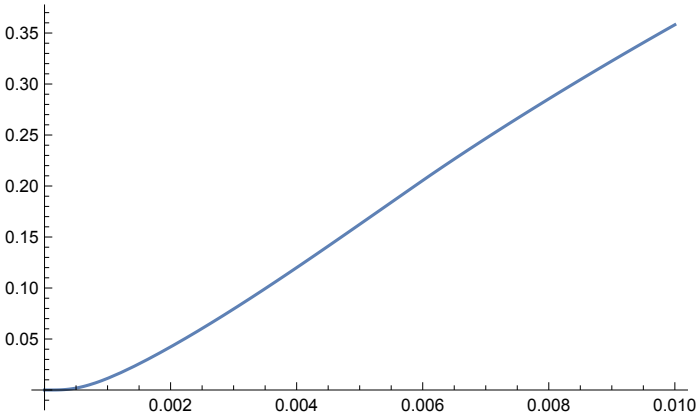


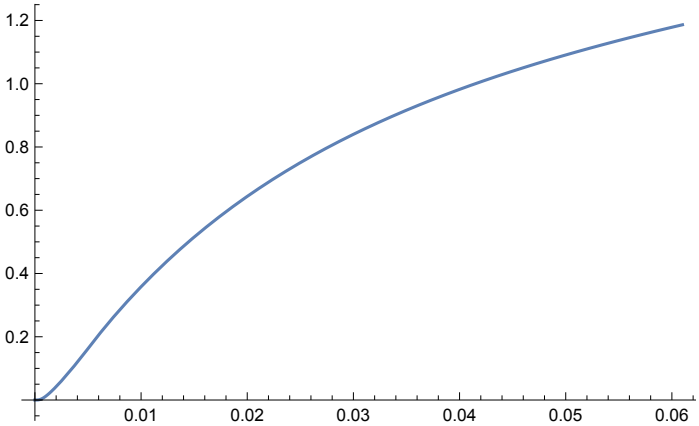
Mono: chi2 = 5.58377 d = 0.0011993 a = 3.65135 t = 0.14452

Bi: ratio chi2Mono/chi2Bi = 1.01736 d = 0.00570821 a = 7.12504 a1 = 0.206737 t1 =0.00417496 t2 = 0.346833

--- Ca = 2.48791

uM ---





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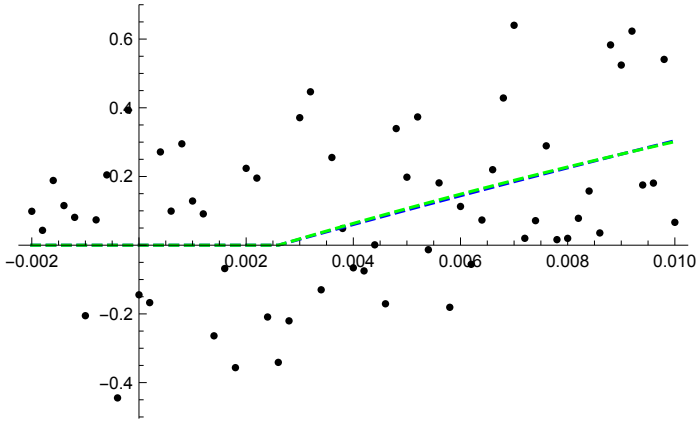


```
Mono: chi2 = 2.96837     d = 2.96837     a = 2.81606     t = 0.0647612
Bi: ratio chi2Mono/chi2Bi = 0.999371     d = 0.0026     a =
 1.9111     a1 = 0.615766     t1 =0.0198887     t2 = 0.083341
Long trace was used for fitting.
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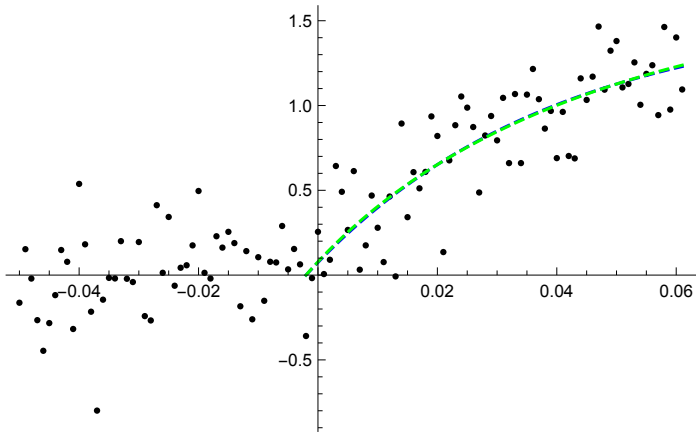


```
Mono: chi2 = 5.95935     d = -0.002     a = 1.56527     t = 0.0408761

Bi: ratio chi2Mono/chi2Bi = 1.00015     d = -0.002     a =
 1.68419     a1 = 0.0988219     t1 =0.0114179     t2 = 0.049668

------------------------------------------------------------------------- C10

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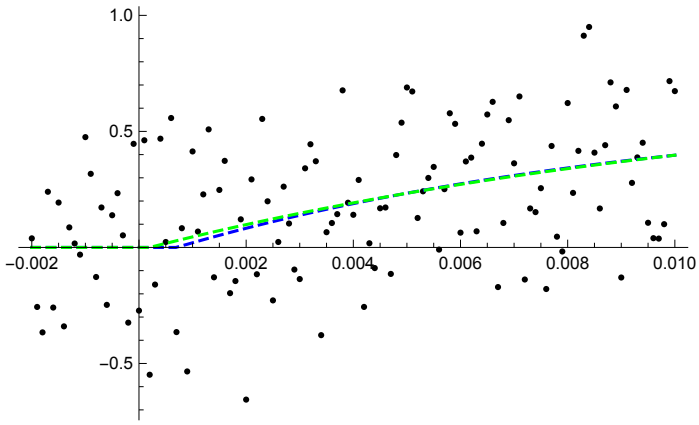


```
Mono: chi2 = 10.1039     d = 10.1039     a = 0.621612     t = 0.00911678
Bi: ratio chi2Mono/chi2Bi = 1.00045     d = 0.0002     a =
 0.981606     a1 = 0.691614     t1 =0.0120293     t2 = 0.231224
Long trace was used for fitting.
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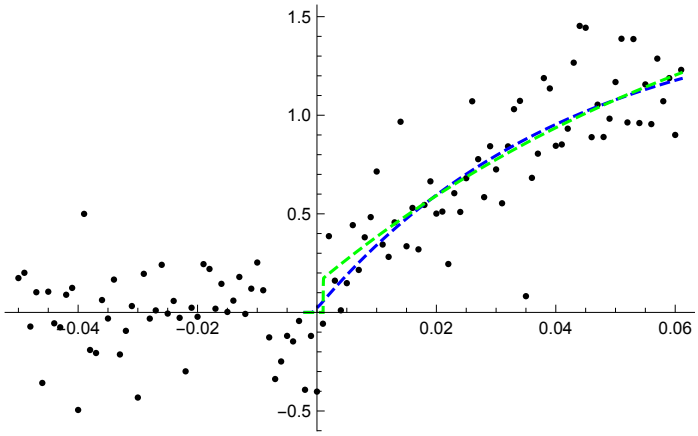


```
Mono: chi2 = 5.04698     d = -0.000542515     a = 1.54552     t = 0.0422381
Bi: ratio chi2Mono/chi2Bi = 1.01927     d = 0.0010367     a =
 2.11541     a1 = 0.172739     t1 =0.0000175794     t2 = 0.0779925
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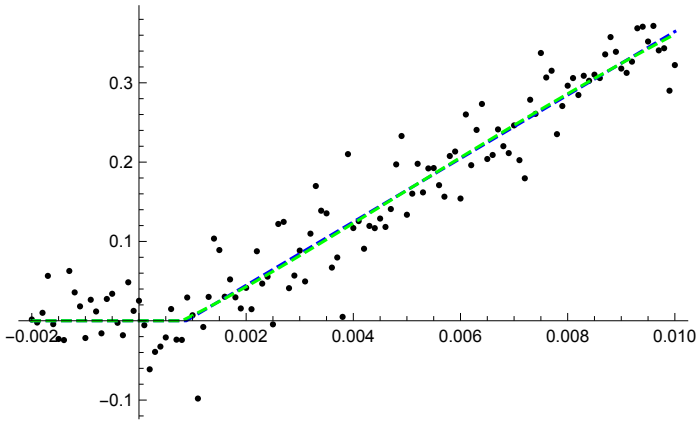


```
Mono: chi2 = 0.154864     d = 0.154864     a = 395 151.     t = 9880.61

Bi: ratio chi2Mono/chi2Bi = 1.00374     d = 0.0008     a =
 0.911294     a1 = -0.211688     t1 =0.00437653     t2 = 0.0137797

Long trace was used for fitting.

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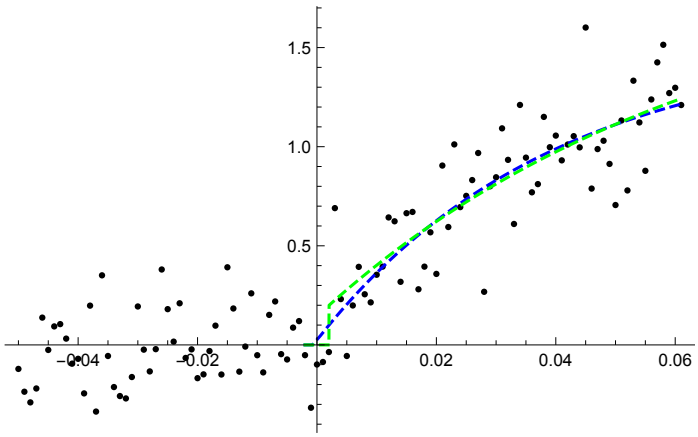

Mono: chi2 = 4.30761 d = -0.000628169 a = 1.5362 t = 0.0393707

Bi: ratio chi2Mono/chi2Bi = 1.01971 d = 0.00201413 a = 1.9434 a1 = 0.199498 t1 = 4.23844×10^{-6} t2 = 0.0647057

```
----------------     Ca = 2.62605
  uM          -----------------------------------------------------
-----------------------------------------------------------------------------------------
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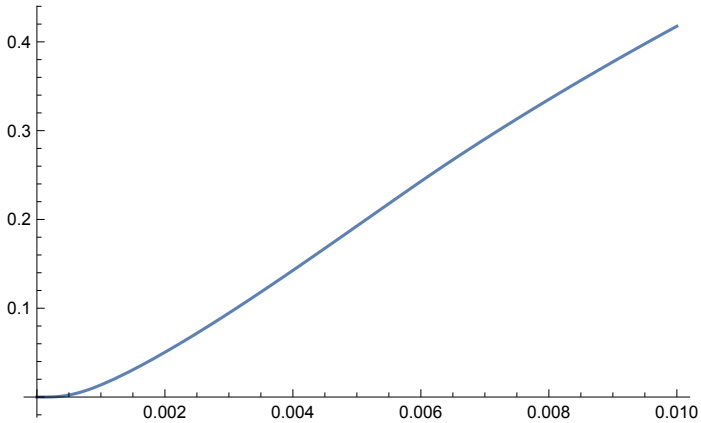

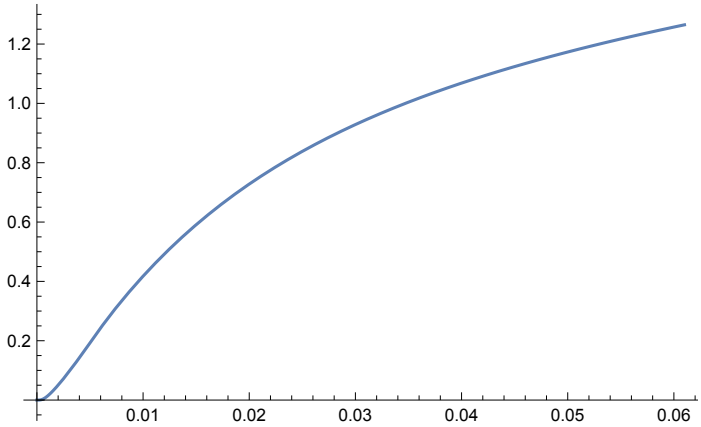


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------------------------------------------------------------------------------ C5
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FittedModel: The sum of squared errors is not a non−negative number. The model may suffer from significant numerical error or may not be appropriate for the data.

General: Further output of FittedModel::bdfit will be suppressed during this calculation.

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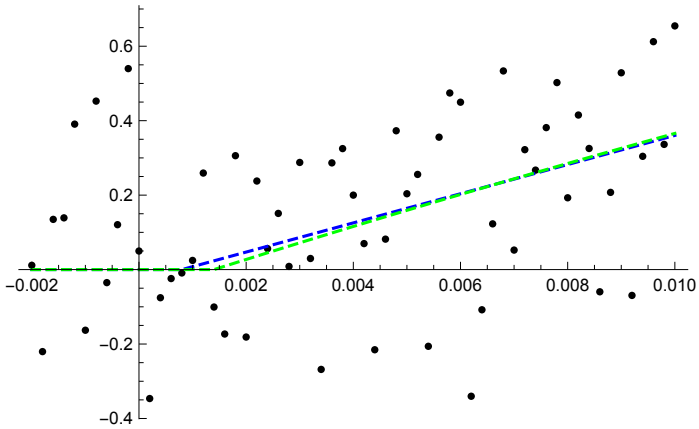


```
Mono: chi2 = 3.1076     d = 3.1076     a = 206.955     t = 5.27848

Bi: ratio chi2Mono/chi2Bi = 0.998585     d = 0.0014     a =
 1.38949     a1 = 2.14652     t1 =0.0529795     t2 = -0.151901

Long trace was used for fitting.

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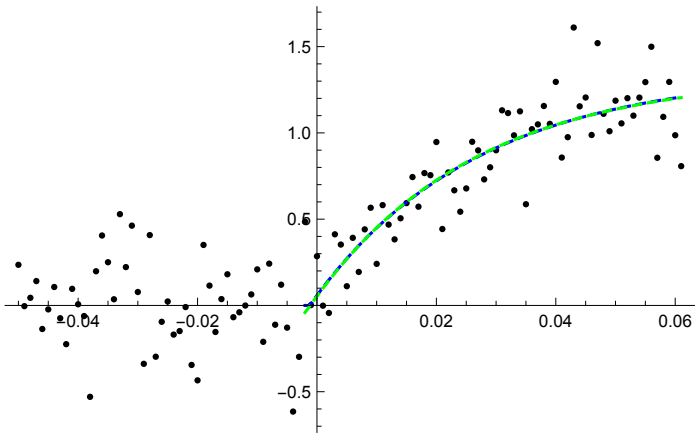


```
Mono: chi2 = 5.11072     d = -0.0012211     a = 1.35145     t = 0.0277503
Bi: ratio chi2Mono/chi2Bi = 1.02274     d = -0.0072074     a =
 1.33869     a1 = -0.342224     t1 =0.00130709     t2 = 0.0269796
------------------------------------------------------------------------- C10
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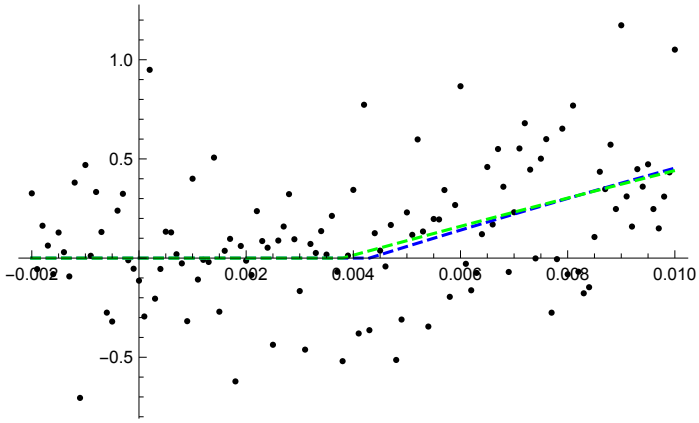


```
Mono: chi2 = 11.1534     d = 11.1534     a = 4.06013     t = 0.0481156
Bi: ratio chi2Mono/chi2Bi = 1.00044     d = 0.0038     a =
 2.98942     a1 = -0.630106     t1 =0.0134443     t2 = 0.030084
Long trace was used for fitting.
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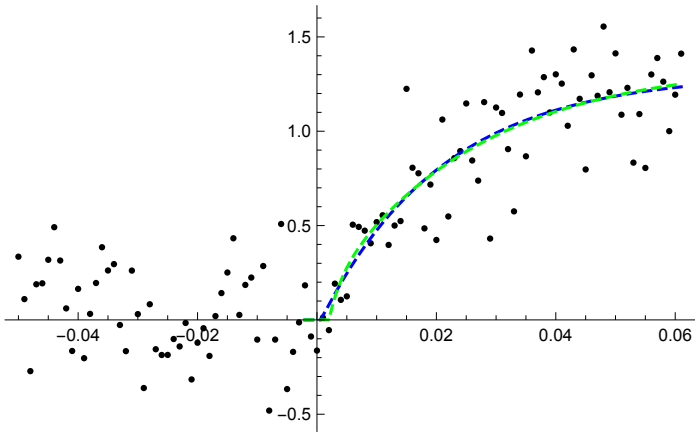


```
Mono: chi2 = 5.57587     d = 0.000693534     a = 1.30474     t = 0.0205686

Bi: ratio chi2Mono/chi2Bi = 1.00459     d = 0.002     a =
 1.36171     a1 = 0.184199     t1 =0.00200463     t2 = 0.0249808

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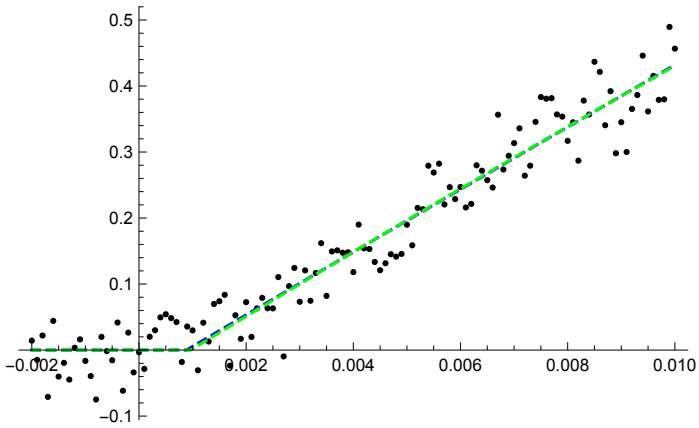


```
Mono: chi2 = 0.173241     d = 0.173241     a = 17.8474     t = 0.37199
Bi: ratio chi2Mono/chi2Bi = 1.00049     d = 0.000965804     a =
 4.7244     a1 = -0.110365     t1 =-0.067496     t2 = 0.10073
Long trace was used for fitting.
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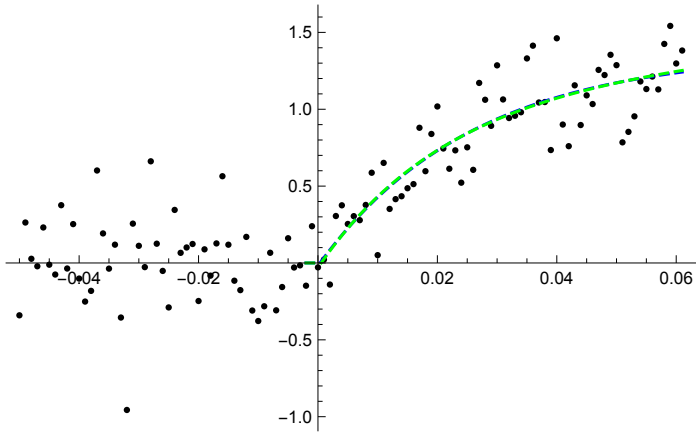


```
Mono: chi2 = 6.12708     d = 0.000347755     a = 1.37411     t = 0.0258917
Bi: ratio chi2Mono/chi2Bi = 1.00026     d = 0.000535962
      a = 6.79764     a1 = 1.10383     t1 =0.021158     t2 = 1.59471
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 2.77177
  uM          -------------------------------------------------------
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  -------------------------
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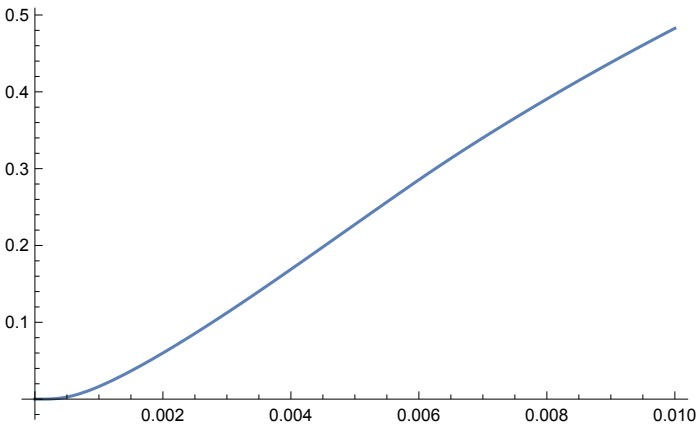

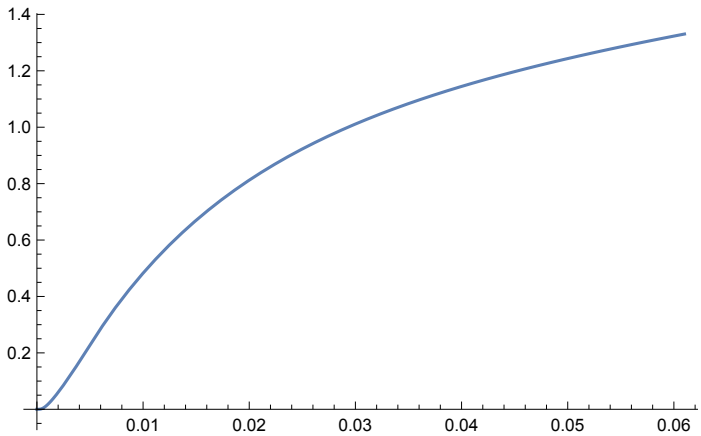

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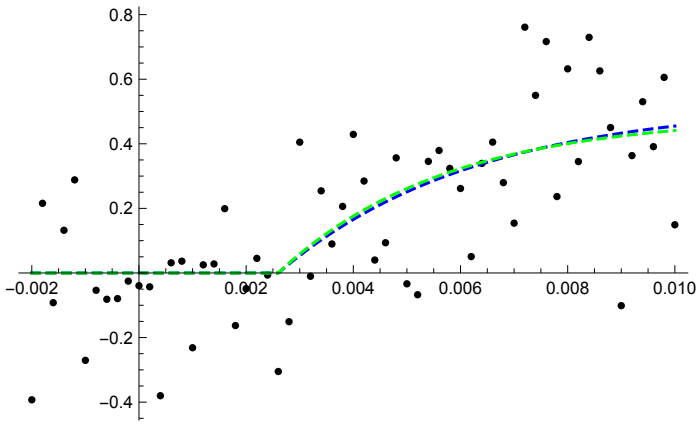


```
Mono: chi2 = 2.35876     d = 2.35876     a = 0.5258     t = 0.00369261
Bi: ratio chi2Mono/chi2Bi = 0.999706     d = 0.0026     a =
 0.429527     a1 = 0.488746     t1 =0.0031238     t2 = 0.231201
Long trace was used for fitting.
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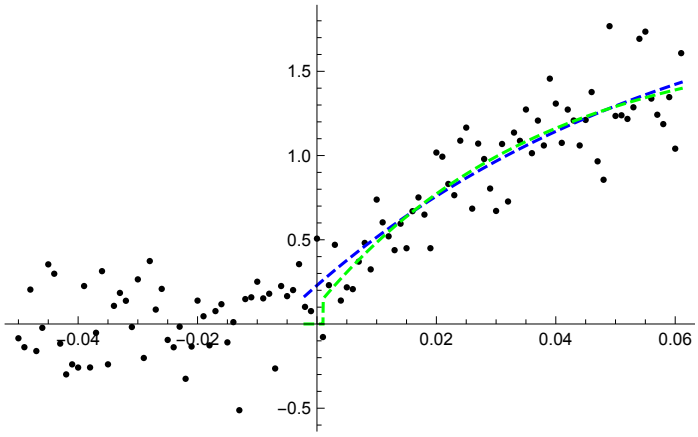


```
Mono: chi2 = 4.40144     d = -0.007     a = 2.16343     t = 0.0625063
Bi: ratio chi2Mono/chi2Bi = 0.967629     d = 0.00101256     a =
 1.70967     a1 = 0.14894     t1 =0.00001838     t2 = 0.0372259
------------------------------------------------------------------------ C10
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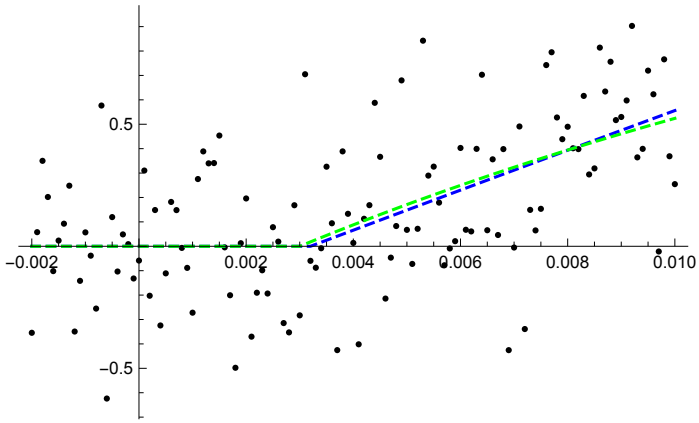


```
Mono: chi2 = 9.07934     d = 9.07934     a = 34.0795     t = 0.413342
Bi: ratio chi2Mono/chi2Bi = 0.997658     d = 0.003     a =
 1.9161     a1 = 0.757999     t1 =0.0136409     t2 = 0.0332638
Long trace was used for fitting.
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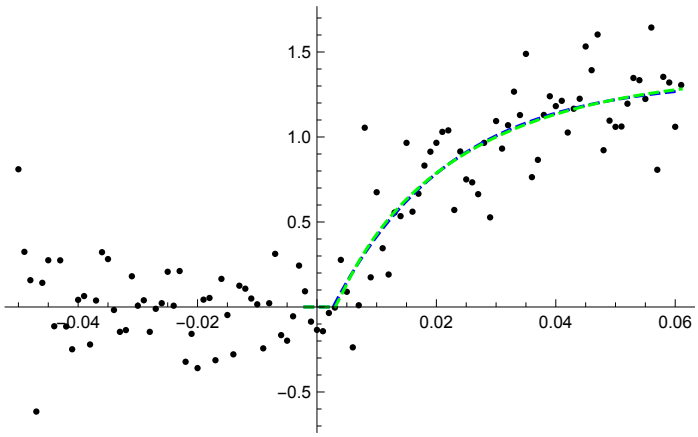


```
Mono: chi2 = 5.82649     d = 0.0027283     a = 1.33933     t = 0.0195636
Bi: ratio chi2Mono/chi2Bi = 1.00071     d = 0.00321412     a =
 1.38364     a1 = 0.185174     t1 =0.00583963     t2 = 0.0234331
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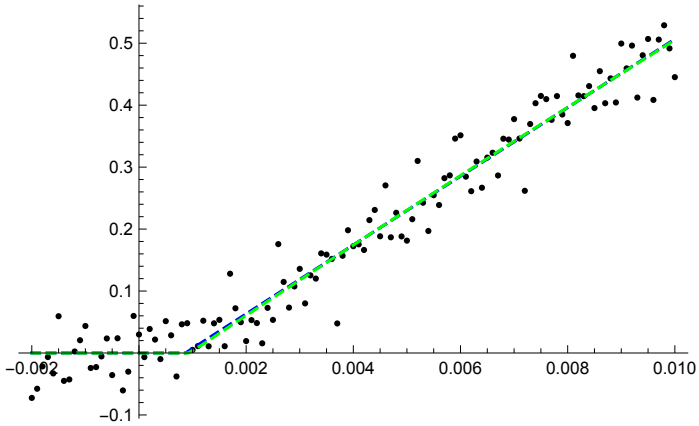


```
Mono: chi2 = 0.164382     d = 0.164382     a = 45.8751     t = 0.822446
Bi: ratio chi2Mono/chi2Bi = 1.00027     d = 0.000949785
      a = 2.8955     a1 = 6.19492     t1 =0.116811     t2 = -0.693847
Long trace was used for fitting.
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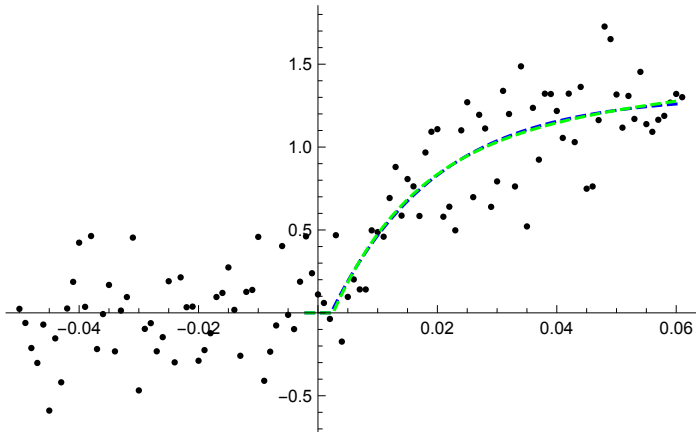
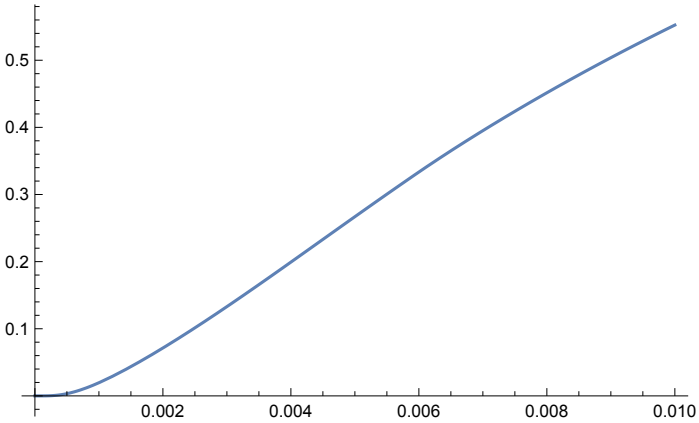


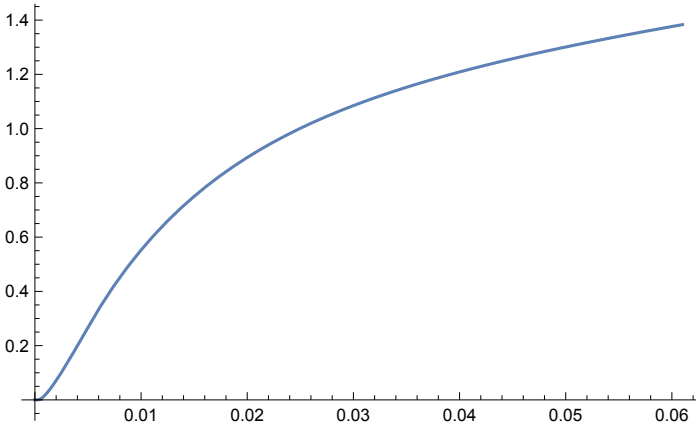
Mono: chi2 = 6.58881 d = 0.00220459 a = 1.3098 t = 0.0176787

Bi: ratio chi2Mono/chi2Bi = 1.0007 d = 0.00253324 a = 1.72814 a1 = 1.00577 t1 =0.0133677 t2 = 0.114721

--- Ca = 2.92648

uM ---





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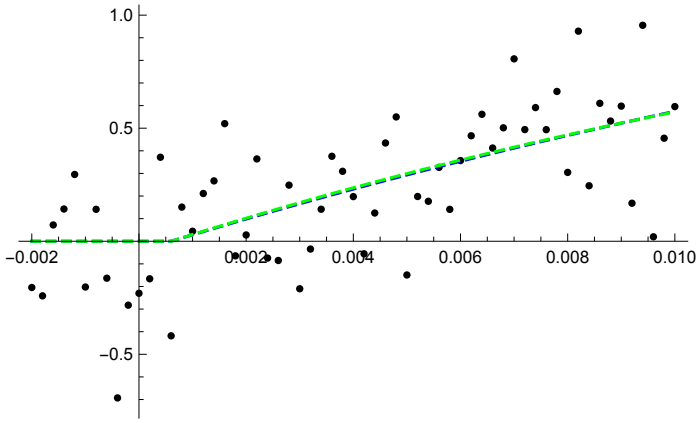


```
Mono: chi2 = 3.63182     d = 3.63182     a = 1.98661     t = 0.0275371
Bi: ratio chi2Mono/chi2Bi = 0.999743     d = 0.0006     a =
 1.36676     a1 = 1.72158     t1 =0.0221218     t2 = 0.135887
Long trace was used for fitting.
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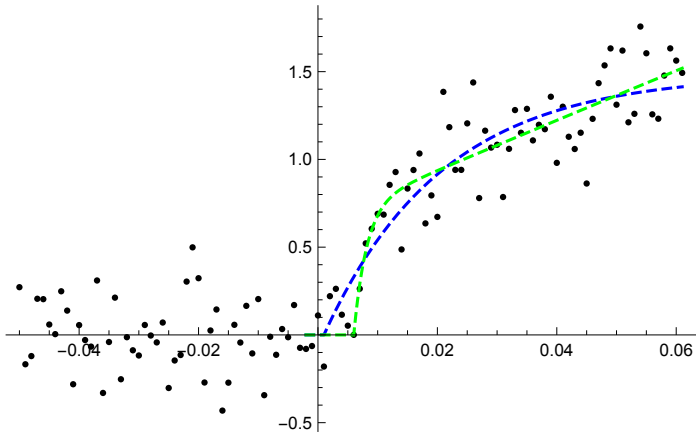


```
Mono: chi2 = 4.27292     d = 0.001     a = 1.48579     t = 0.0198485

Bi: ratio chi2Mono/chi2Bi = 1.08251     d = 0.0059966     a =
 32.0852     a1 = 0.735811     t1 =0.00214392     t2 = 2.17301

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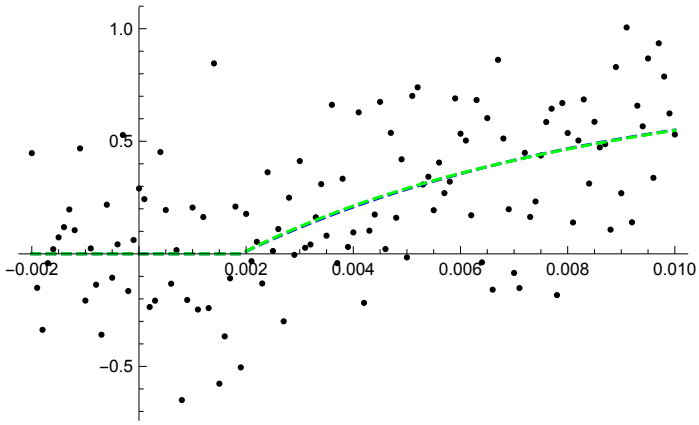


```
Mono: chi2 = 9.4741     d = 9.4741     a = 0.798468     t = 0.00694044
Bi: ratio chi2Mono/chi2Bi = 1.00069     d = 0.0019     a =
 1.61689     a1 = 0.443753     t1 =0.00458553     t2 = 0.0483459
Long trace was used for fitting.
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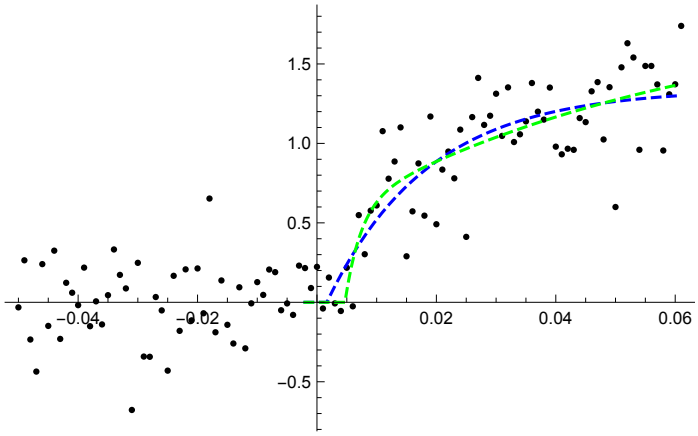


```
Mono: chi2 = 6.50482     d = 0.00166242     a = 1.34164     t = 0.0169689
Bi: ratio chi2Mono/chi2Bi = 1.03297     d = 0.00469334     a =
 1.86651     a1 = 0.602384     t1 =0.00263501     t2 = 0.0597986
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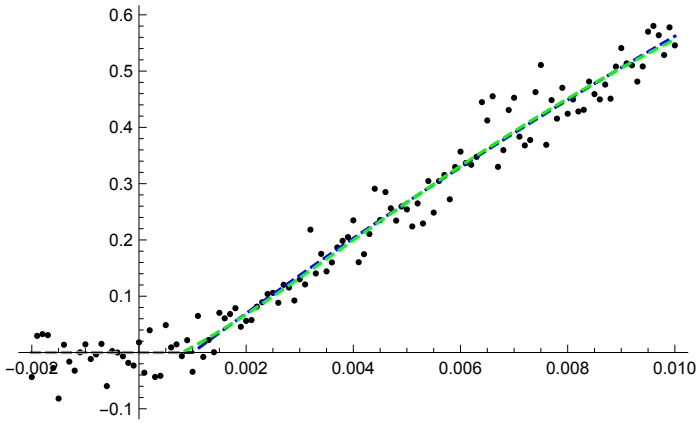


```
Mono: chi2 = 0.129114     d = 0.129114     a = 2.5642     t = 0.0363772

Bi: ratio chi2Mono/chi2Bi = 1.00642     d = 0.0008     a =
 1.15179     a1 = -0.14117     t1 =0.00239818     t2 = 0.0119428

Long trace was used for fitting.

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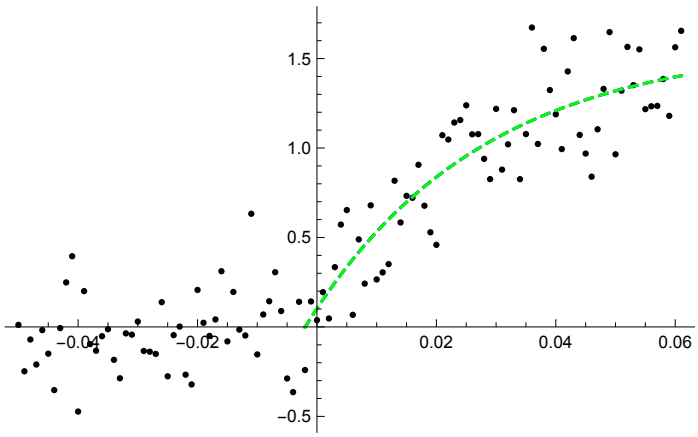


```
Mono: chi2 = 5.20715     d = -0.00196139     a = 1.59067     t = 0.029369

Bi: ratio chi2Mono/chi2Bi = 1.0002     d = -0.002     a =
 1.58199     a1 = -0.229048     t1 =0.0196146     t2 = 0.0277684

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----------------     Ca = 3.0905
  uM          -----------------------------------------------------
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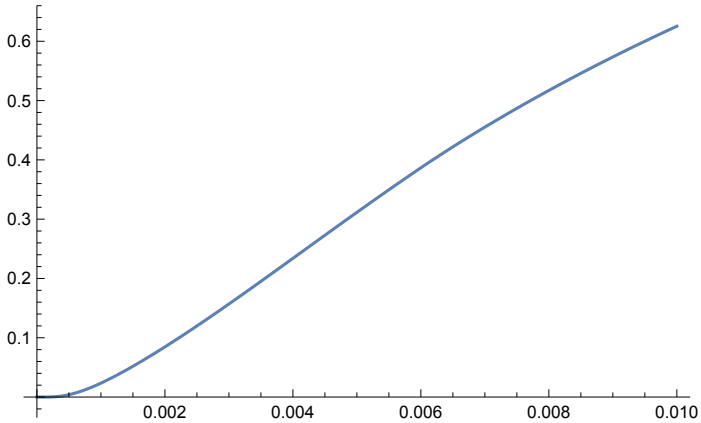

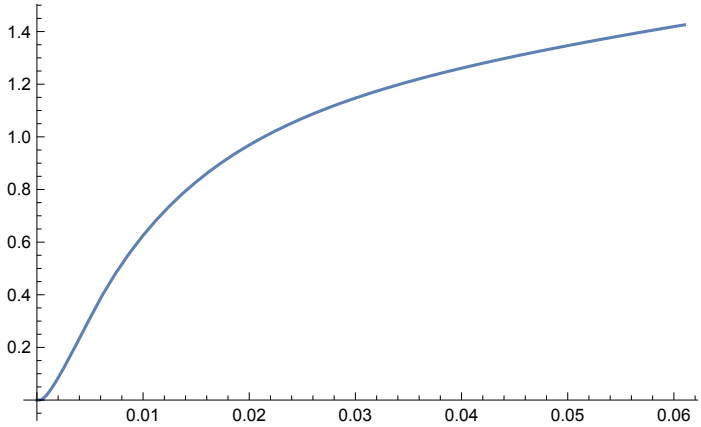


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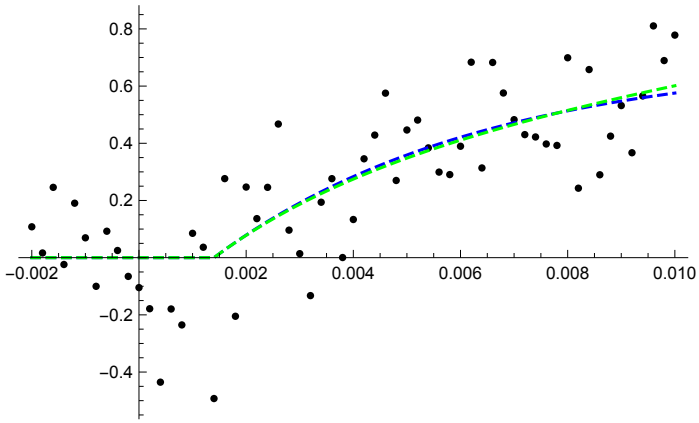


```
Mono: chi2 = 1.88622     d = 1.88622     a = 0.702862     t = 0.00503315
Bi: ratio chi2Mono/chi2Bi = 1.00427     d = 0.0014     a =
 1.64383     a1 = 0.252773     t1 =0.00274883     t2 = 0.0287723
Long trace was used for fitting.
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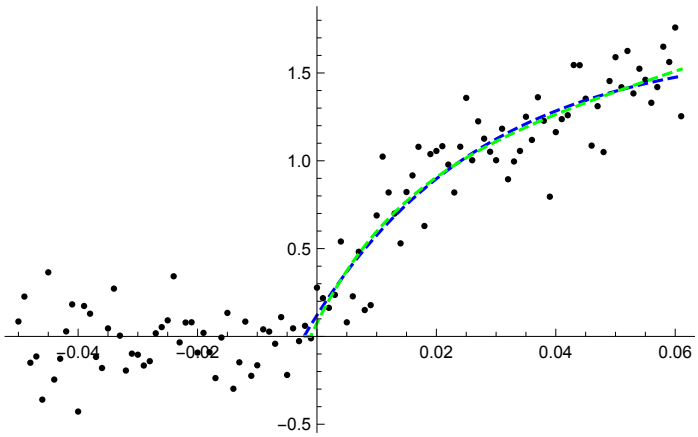


```
Mono: chi2 = 3.49682      d = -0.00215728      a = 1.66516      t = 0.0286167
Bi: ratio chi2Mono/chi2Bi = 1.01004      d = -0.00107033
      a = 27.7406      a1 = 0.865484      t1 =0.0137706      t2 = 2.4758
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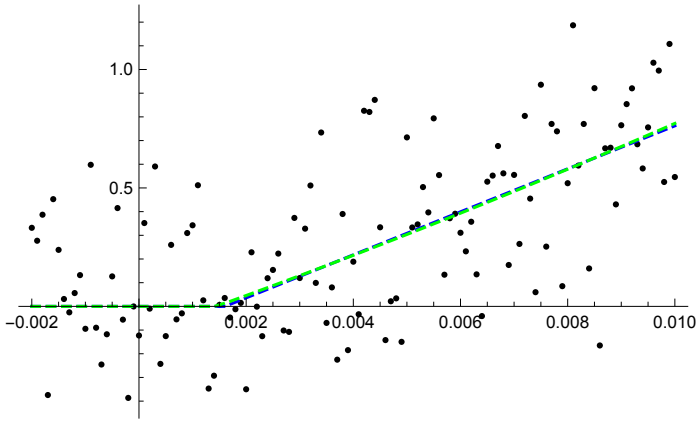

Mono: chi2 = 9.63847 d = 9.63847 a = 1.01453×10^{7} t = 111 754.

Bi: ratio chi2Mono/chi2Bi = 1.00025 d = 0.00144386

a = 282.778 a1 = -2492.71 t1 =0.3207 t2 = 0.353361

Long trace was used for fitting.

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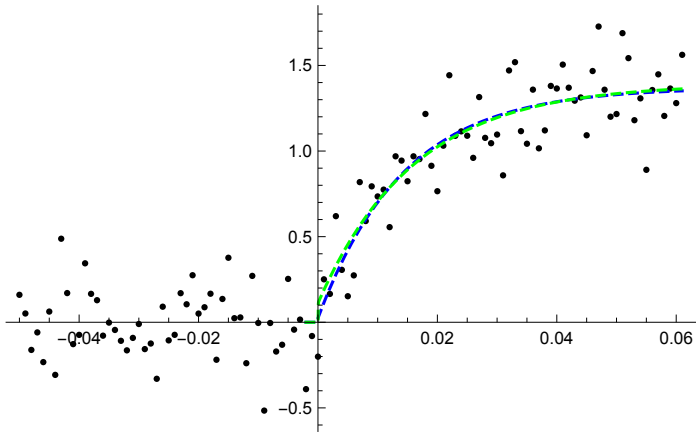


```
Mono: chi2 = 4.02438     d = -0.000250526     a = 1.37053     t = 0.01432

Bi: ratio chi2Mono/chi2Bi = 1.00756     d = 0.0000304476     a =
 1.3913     a1 = 0.113705     t1 =0.0000161038     t2 = 0.015992

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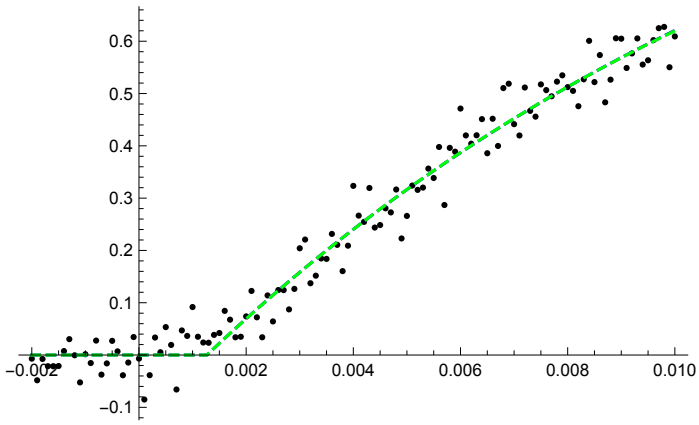


```
Mono: chi2 = 0.162893     d = 0.162893     a = 1.27173     t = 0.0130472
Bi: ratio chi2Mono/chi2Bi = 1.0015     d = 0.00126736     a =
 0.628793     a1 = 2.62766     t1 =0.0175282     t2 = 0.037902
Long trace was used for fitting.
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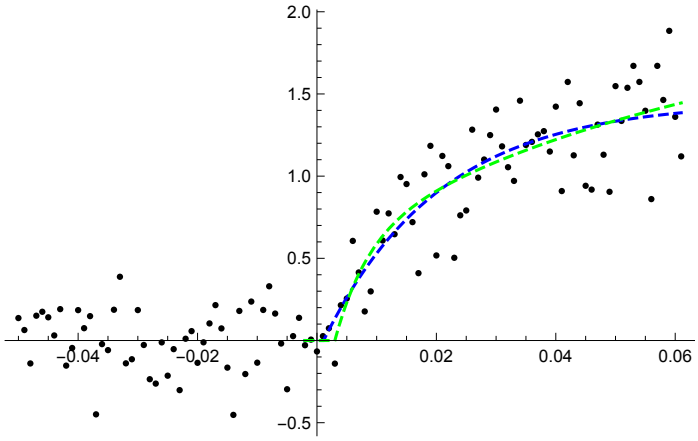


```
Mono: chi2 = 5.01318     d = 0.00111245     a = 1.45372     t = 0.0195861
Bi: ratio chi2Mono/chi2Bi = 1.01439     d = 0.003     a =
 2.05427     a1 = 0.61651     t1 =0.00543442     t2 = 0.0675313
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  --------------------------
----------------     Ca = 3.26357
  uM          -------------------------------------------------------
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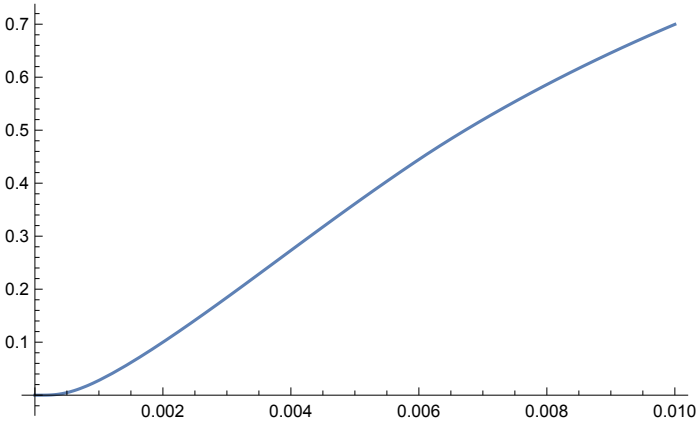

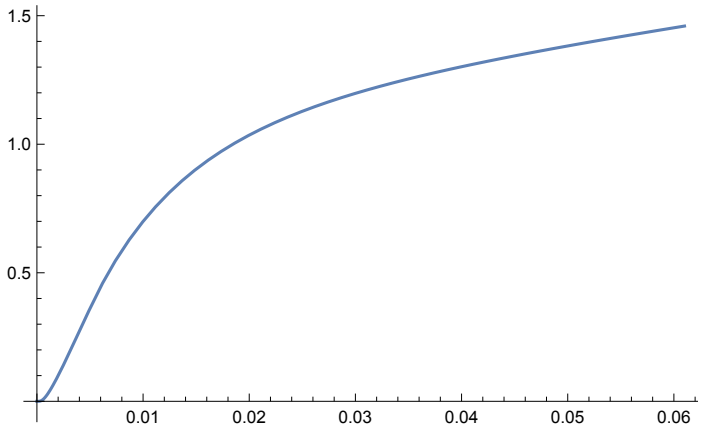

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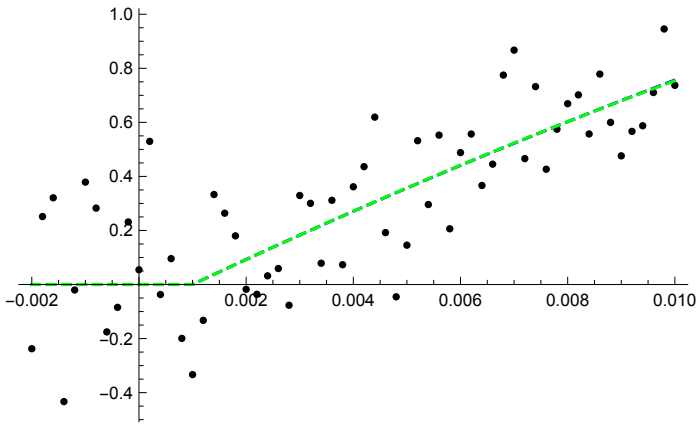


```
Mono: chi2 = 2.40342     d = 2.40342     a = 3.82285     t = 0.0408217
Bi: ratio chi2Mono/chi2Bi = 1.00031     d = 0.001     a =
 2.44434     a1 = -0.408622     t1 =0.00873966     t2 = 0.0204261
Long trace was used for fitting.
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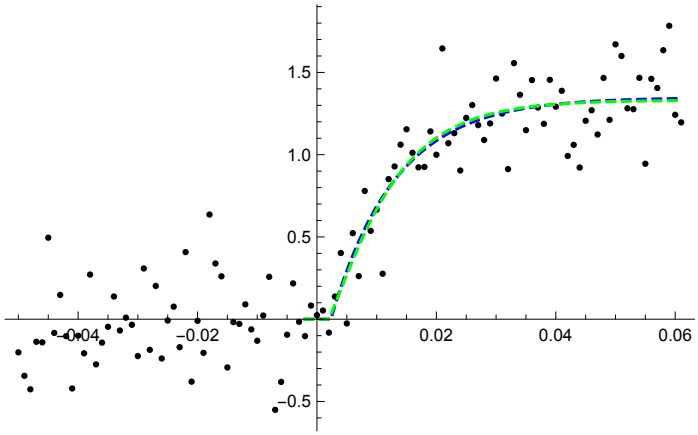


```
Mono: chi2 = 5.53061     d = 0.00232762     a = 1.34759     t = 0.0107907
Bi: ratio chi2Mono/chi2Bi = 1.00161     d = 0.002     a =
 1.33098     a1 = 1.7357     t1 =0.00894149     t2 = 0.00371838
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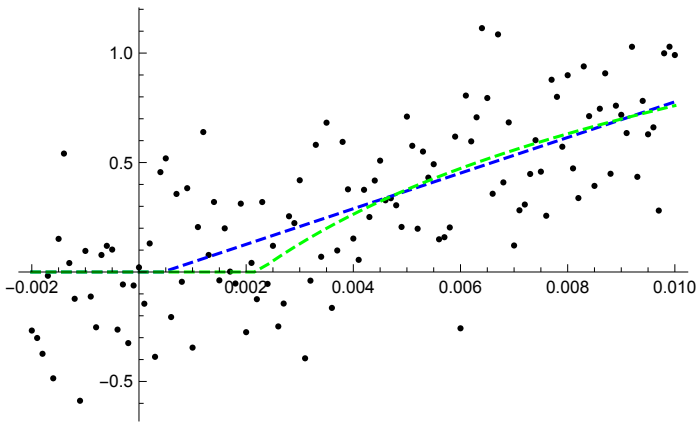

```
Mono: chi2 = 8.68387     d = 8.68387     a = 9.23655 × 10^6     t = 113516.
Bi: ratio chi2Mono/chi2Bi = 1.00627     d = 0.0022     a =
 2.73049     a1 = 0.378707     t1 =0.00326639     t2 = 0.0400647
Long trace was used for fitting.
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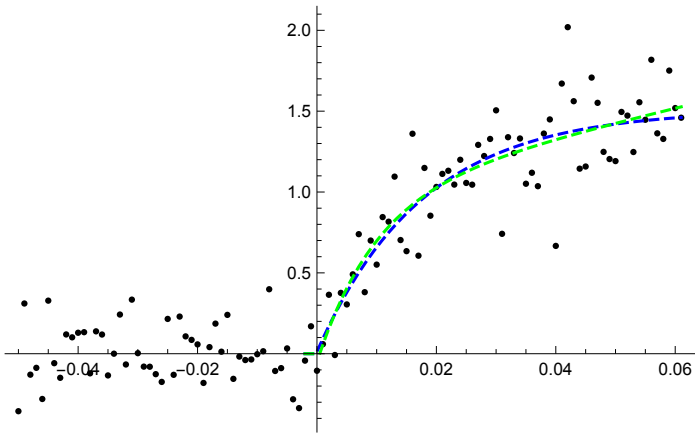


```
Mono: chi2 = 4.58853      d = -0.000133841      a = 1.50868      t = 0.0176751
Bi: ratio chi2Mono/chi2Bi = 1.01306      d = 0.000465886      a =
 13.6752      a1 = 0.977437      t1 =0.00975108      t2 = 1.36388
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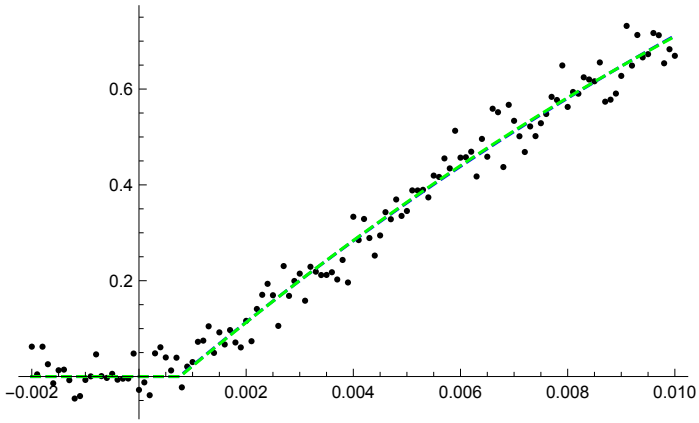


```
Mono: chi2 = 0.145091     d = 0.145091     a = 2.13143     t = 0.0227644

Bi: ratio chi2Mono/chi2Bi = 1.00257     d = 0.000766539     a =
 3.69808     a1 = 3.49234     t1 =0.0330929     t2 = -0.0177391

Long trace was used for fitting.

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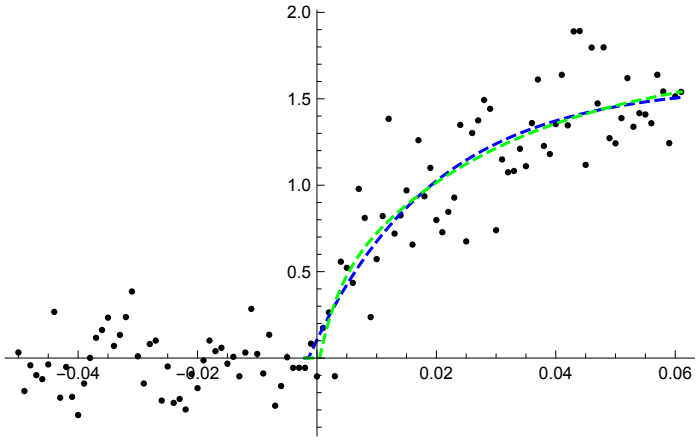


```
Mono: chi2 = 4.91852     d = -0.00141191     a = 1.58458     t = 0.0205877
Bi: ratio chi2Mono/chi2Bi = 1.0178     d = 0.000449859     a =
 1.72743     a1 = 0.382947     t1 =0.00317117     t2 = 0.0306973
--------------------------------------------------------------------------------
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```
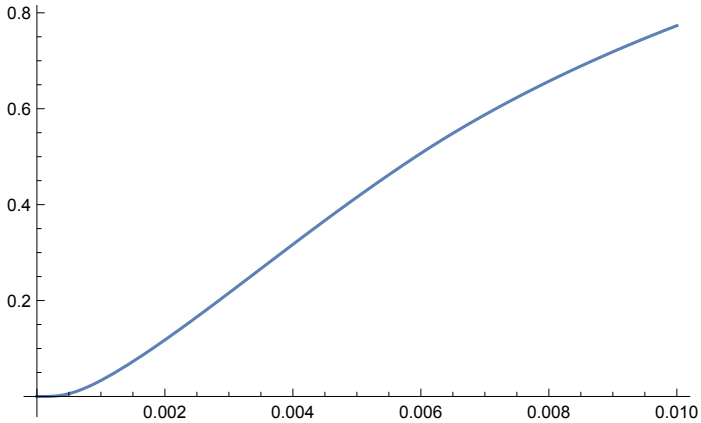
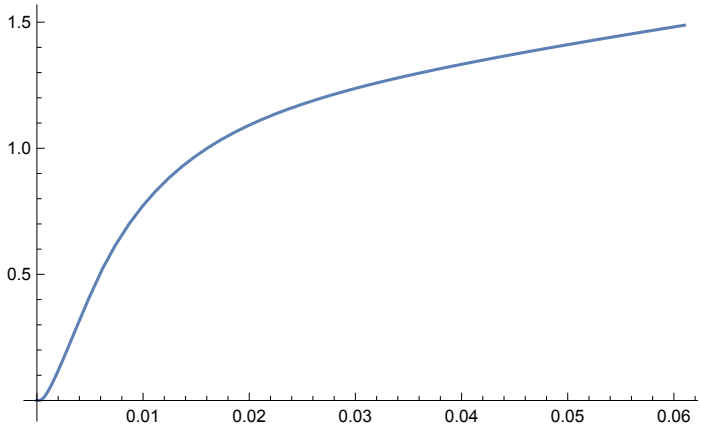

---------- Ca = 3.44741
uM ----------





---------- C5

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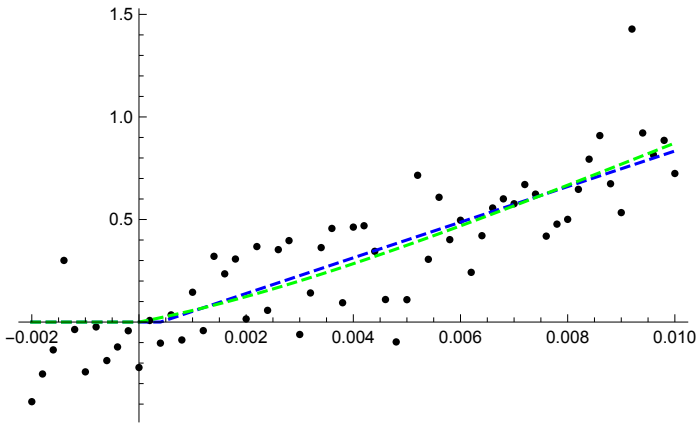

Mono: chi2 = 2.264 d = 2.264 a = 155.07 t = 1.78035

Bi: ratio chi2Mono/chi2Bi = 1.01427 d = -1.16316×10^{-15} a = 4.14998 a1 = −2.01205 t1 =0.00885919 t2 = 0.0222077

Long trace was used for fitting.

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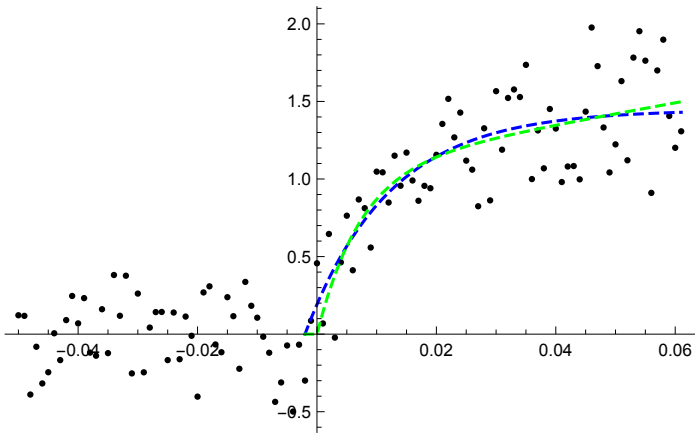


```
Mono: chi2 = 6.93813     d = -0.002     a = 1.44613     t = 0.0140319
Bi: ratio chi2Mono/chi2Bi = 0.991877     d = 0.0000257824
      a = 10.5145     a1 = 1.06153     t1 =0.00717264     t2 = 1.28896
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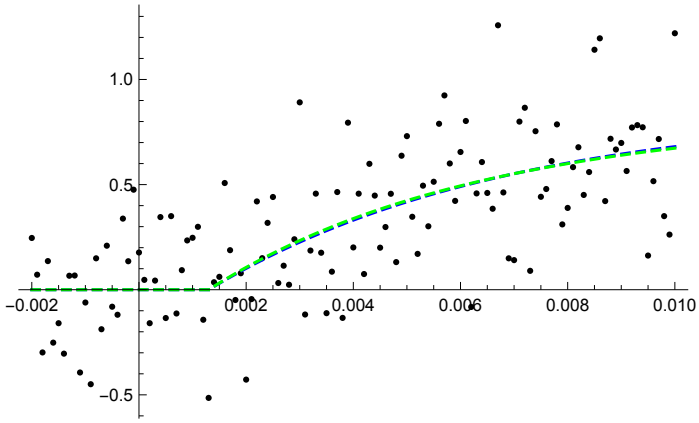


```
Mono: chi2 = 8.50767     d = 8.50767     a = 0.860169     t = 0.005557
Bi: ratio chi2Mono/chi2Bi = 1.00012     d = 0.0013     a =
 4.89491     a1 = 0.735583     t1 =0.00469     t2 = 0.682959
Long trace was used for fitting.
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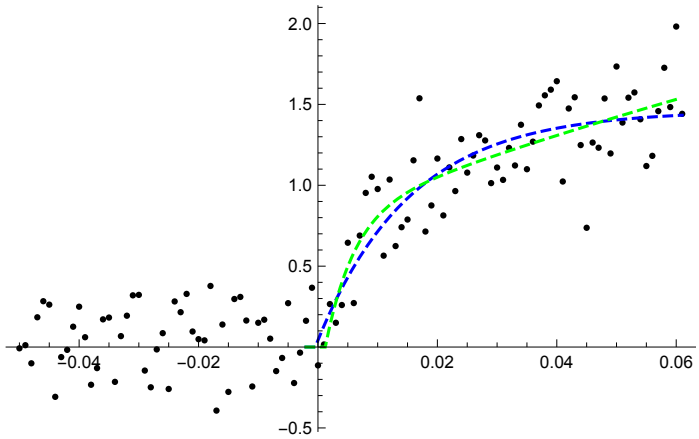


```
Mono: chi2 = 5.3694     d = -0.000451166     a = 1.46125     t = 0.0155571
Bi: ratio chi2Mono/chi2Bi = 1.04267     d = 0.00122685     a =
 4.13544     a1 = 0.820218     t1 =0.00478098     t2 = 0.24359
------------------------------------------------------------------------- D
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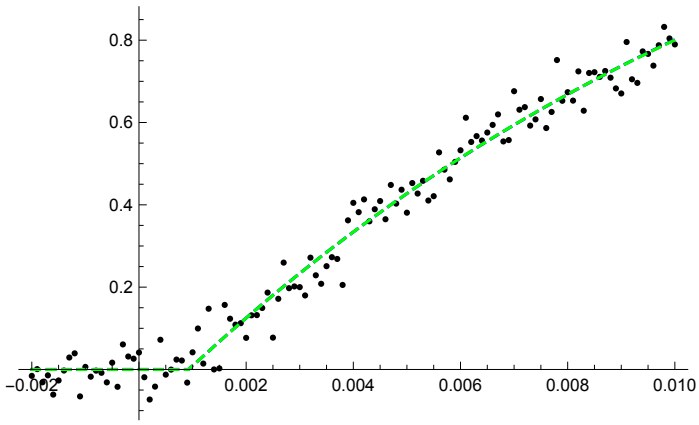


```
Mono: chi2 = 0.206152     d = 0.206152     a = 1.61812     t = 0.0132679
Bi: ratio chi2Mono/chi2Bi = 1.00176     d = 0.000932344     a =
 0.864249     a1 = 3.12726     t1 =0.0174265     t2 = 0.0390986
Long trace was used for fitting.
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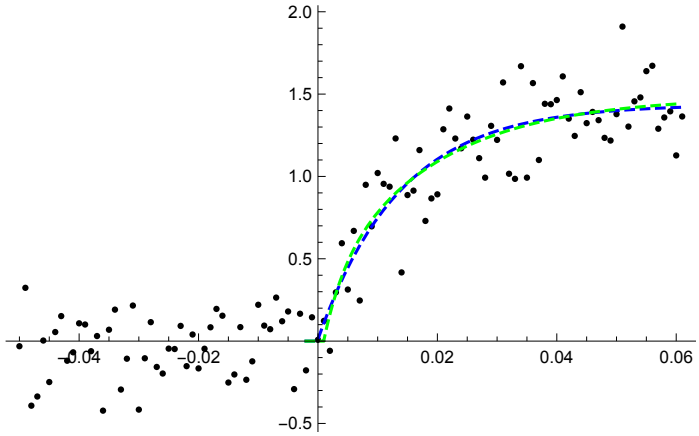


```
Mono: chi2 = 4.37739     d = -0.0000987759     a = 1.43669     t = 0.0137174
Bi: ratio chi2Mono/chi2Bi = 1.00839     d = 0.000960546     a =
 1.48399     a1 = 0.373185     t1 =0.00332535     t2 = 0.0183045
-------------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 3.64088
  uM          -------------------------------------------------------
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```

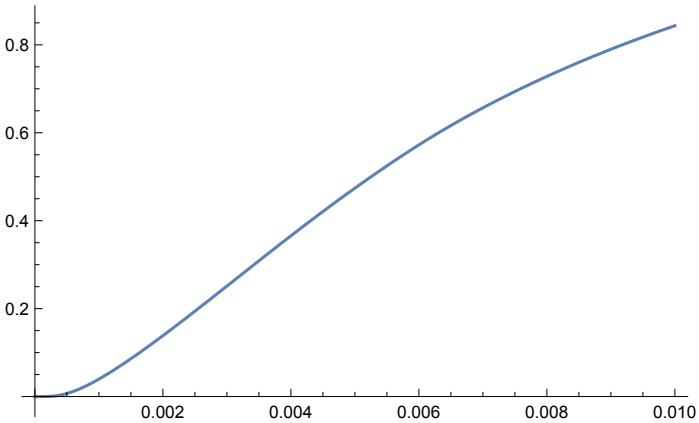

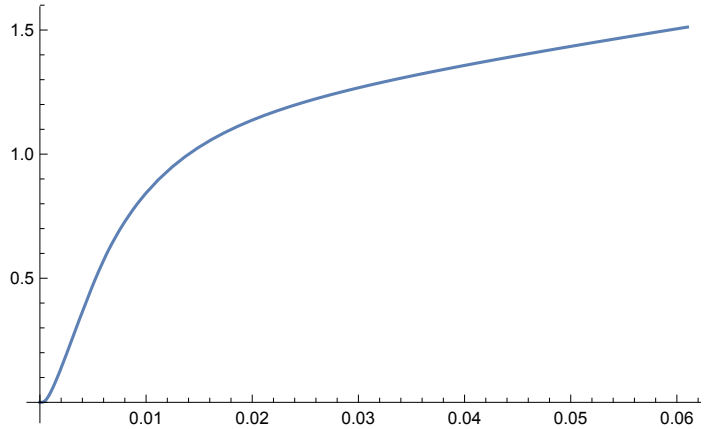

C5

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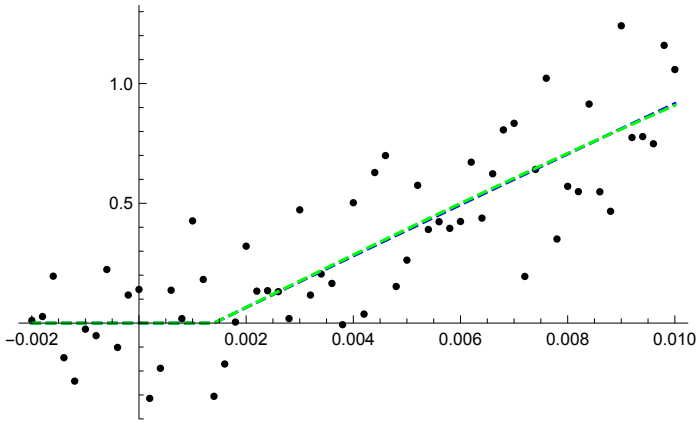


```
Mono: chi2 = 2.51242     d = 2.51242     a = 26.1299     t = 0.240931
Bi: ratio chi2Mono/chi2Bi = 0.998768     d = 0.0014     a =
 3.5016     a1 = -0.84681     t1 =0.0095579     t2 = 0.0219151
Long trace was used for fitting.
take mono
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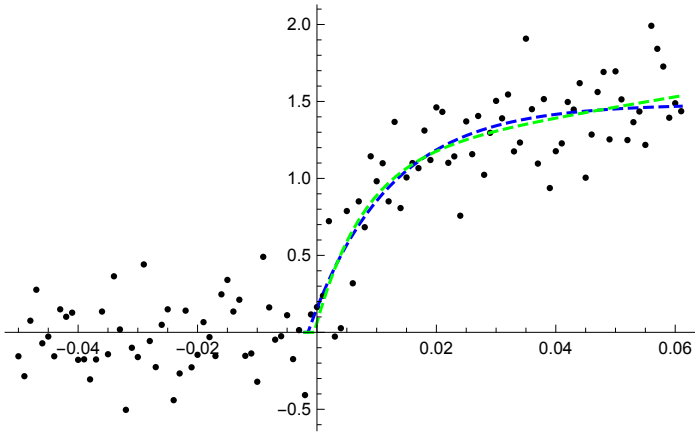


```
Mono: chi2 = 5.9868     d = -0.00149348     a = 1.48306     t = 0.0133865
Bi: ratio chi2Mono/chi2Bi = 1.01294     d = -0.000440709
      a = 16.6377     a1 = 1.12937     t1 =0.00807805     t2 = 2.30575
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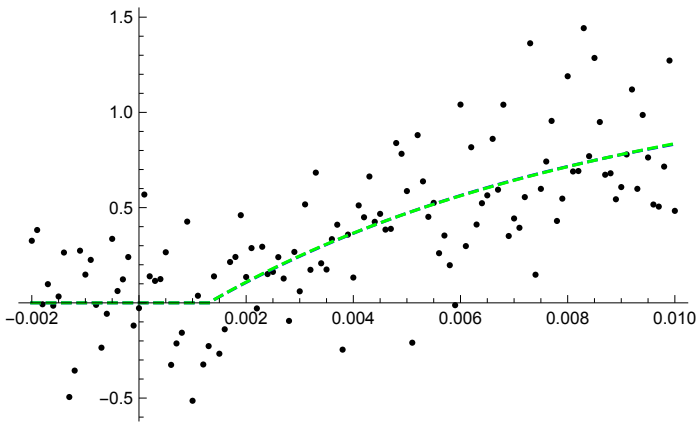

```
Mono: chi2 = 8.73539     d = 8.73539     a = 1.22496     t = 0.00762923
Bi: ratio chi2Mono/chi2Bi = 0.999815     d = 0.0013     a =
 1.43374     a1 = 0.313984     t1 =0.00422916     t2 = 0.0124695
Long trace was used for fitting.
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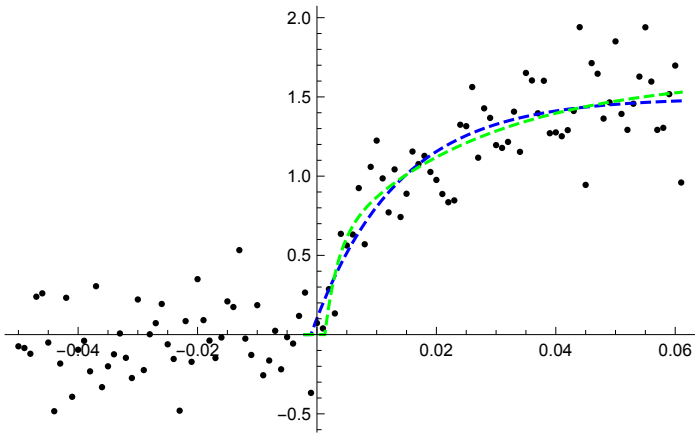


```
Mono: chi2 = 5.37928      d = -0.001      a = 1.49361      t = 0.0141417
Bi: ratio chi2Mono/chi2Bi = 1.0308      d = 0.00132569      a =
 1.63687      a1 = 0.577962      t1 =0.00216058      t2 = 0.0260536
------------------------------------------------------------------------- D
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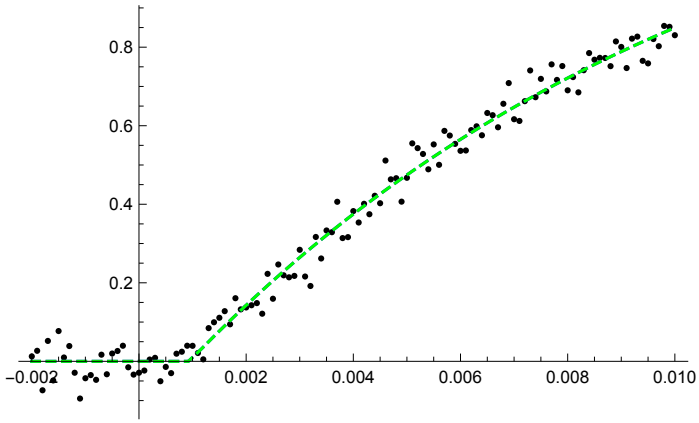


```
Mono: chi2 = 0.156858     d = 0.156858     a = 1.43456     t = 0.0100991
Bi: ratio chi2Mono/chi2Bi = 1.     d = 0.000940921     a =
 1.43456     a1 = 0.664496     t1 =0.0100991     t2 = 0.0100991
Long trace was used for fitting.
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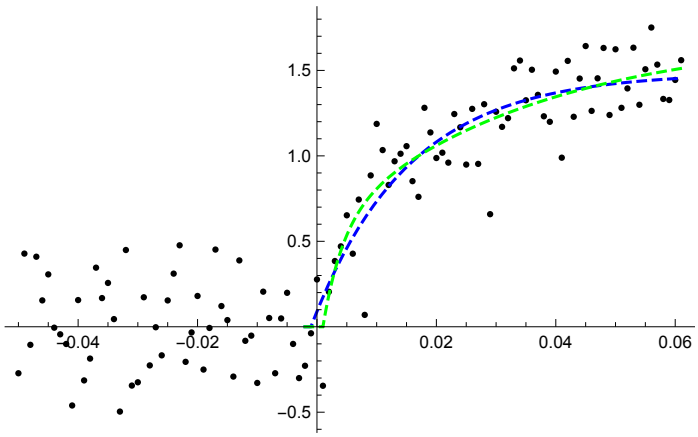


```
Mono: chi2 = 5.89337     d = -0.001     a = 1.48612     t = 0.0161494
Bi: ratio chi2Mono/chi2Bi = 1.03724     d = 0.001     a =
 1.71289     a1 = 0.593284     t1 =0.00333002     t2 = 0.034968
-------------------------------------------------------------------------------------
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----------------     Ca = 3.84593
  uM          -----------------------------------------------------
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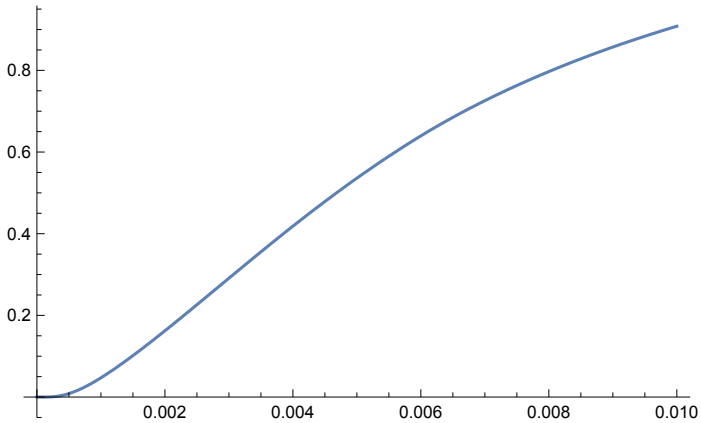

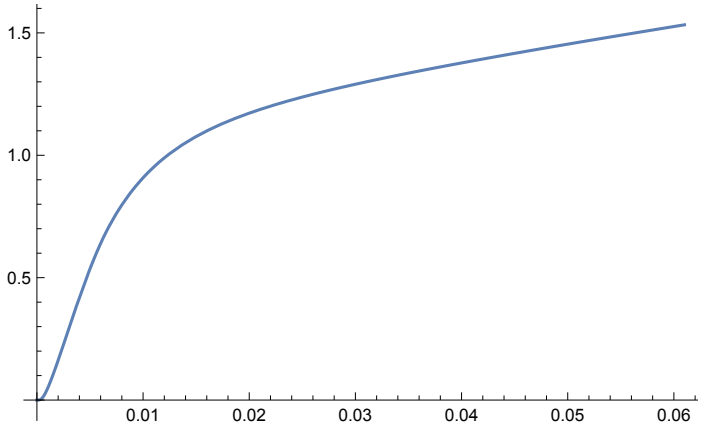


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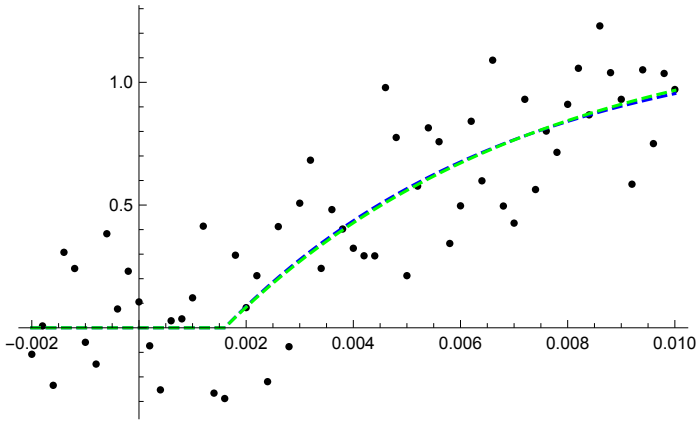


```
Mono: chi2 = 2.89996     d = 2.89996     a = 1.20265     t = 0.00532927

Bi: ratio chi2Mono/chi2Bi = 0.999808     d = 0.0016     a =
 1.41095     a1 = 1.23949     t1 =0.00574694     t2 = 0.0906687

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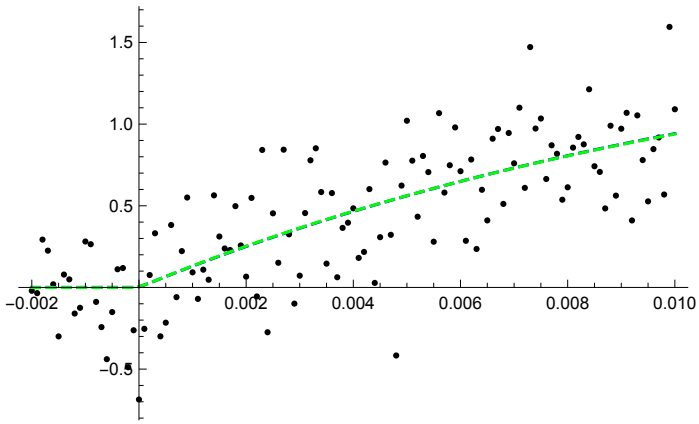

Mono: chi2 = 9.88283 d = 9.88283 a = 1.744 t = 0.0128822

Bi: ratio chi2Mono/chi2Bi = 0.999957 d = -4.38009×10^{-16} a = 1.83914 a1 = 0.305153 t1 =0.00741644 t2 = 0.0159816

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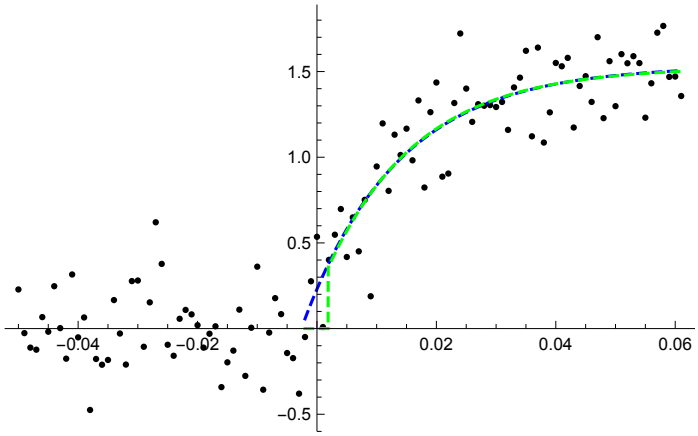

Mono: chi2 = 4.70537 d = −0.00260391 a = 1.53376 t = 0.0159699

Bi: ratio chi2Mono/chi2Bi = 0.968592 d = 0.00187666 a = 1.52577 a1 = 1.17047 t1 =0.0153554 t2 = 9.66979×10^{-7}

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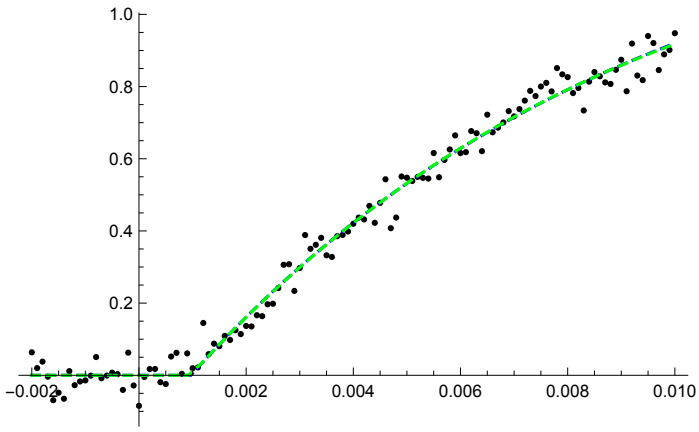
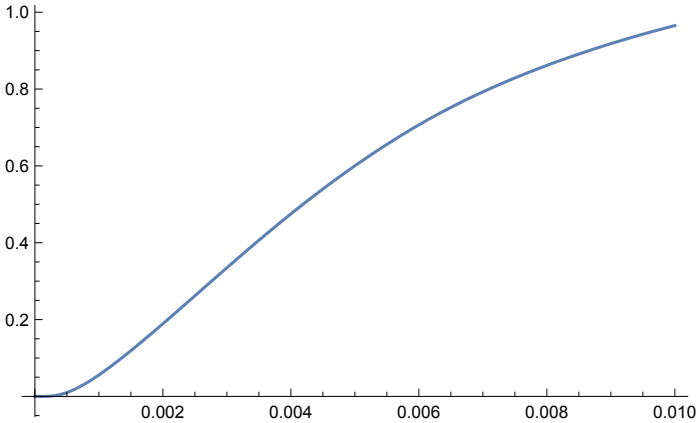


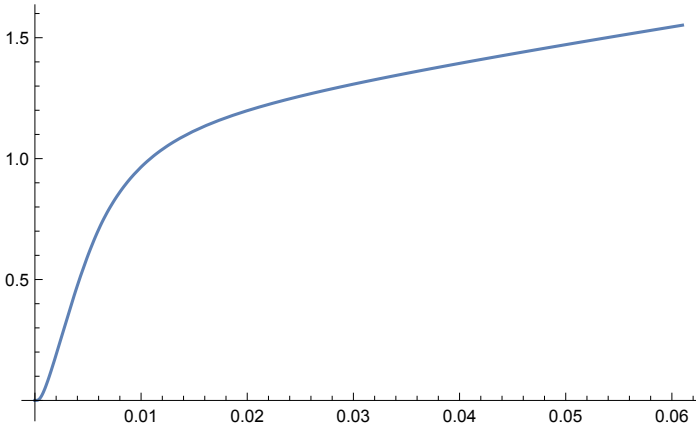
Mono: chi2 = 0.167443 d = 0.167443 a = 1.39984 t = 0.0084383

Bi: ratio chi2Mono/chi2Bi = 1.00558 d = 0.000963663 a = 0.776422 a1 = 2.65955 t1 =0.0112708 t2 = 0.0262208

---------- Ca = 4.06272

uM ----------





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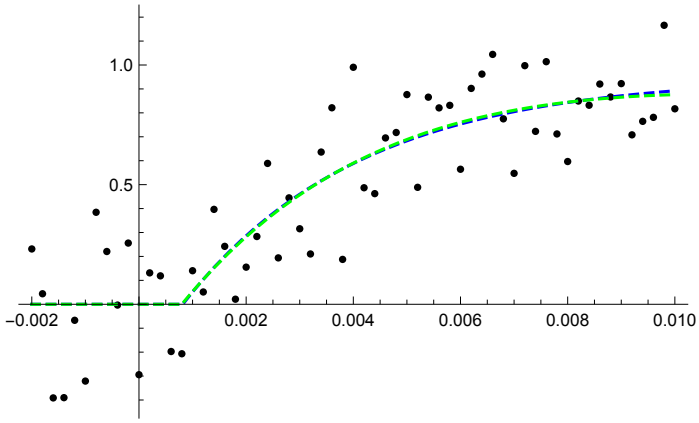


```
Mono: chi2 = 2.34633     d = 2.34633     a = 0.950908     t = 0.00329849
Bi: ratio chi2Mono/chi2Bi = 1.00436     d = 0.0008     a =
 0.534954     a1 = 1.88345     t1 =0.00488519     t2 = 0.0120284
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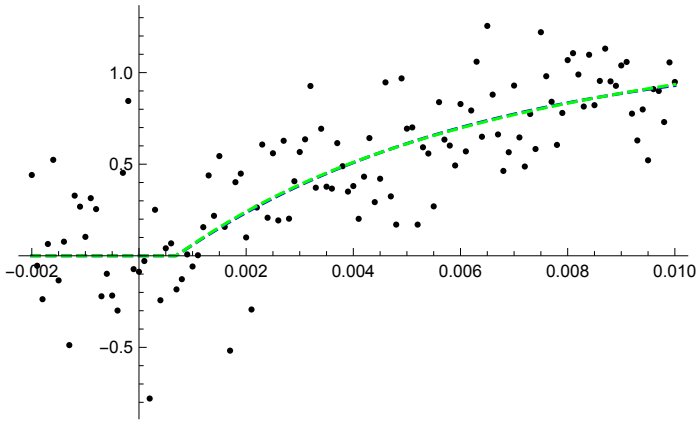


```
Mono: chi2 = 7.9069     d = 7.9069     a = 1.15408     t = 0.00567916

Bi: ratio chi2Mono/chi2Bi = 1.00023     d = 0.0007     a =
 1.82367     a1 = 0.716069     t1 =0.00410678     t2 = 0.0301835

------------------------------------------------------------------------ D

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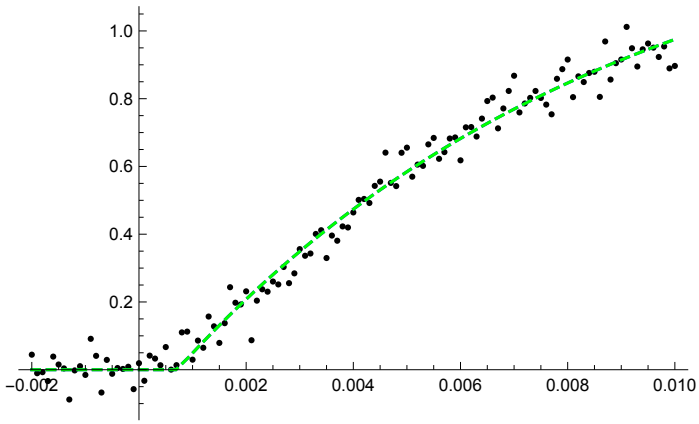


```
Mono: chi2 = 0.231174     d = 0.231174     a = 1.44559     t = 0.00827538
Bi: ratio chi2Mono/chi2Bi = 1.     d = 0.000713198     a =
 1.44559     a1 = 0.953961     t1 =0.00827538     t2 = 0.00827538
--------------------------------------------------------------------------------
  -------------------------
```

---------- Ca = 4.29254
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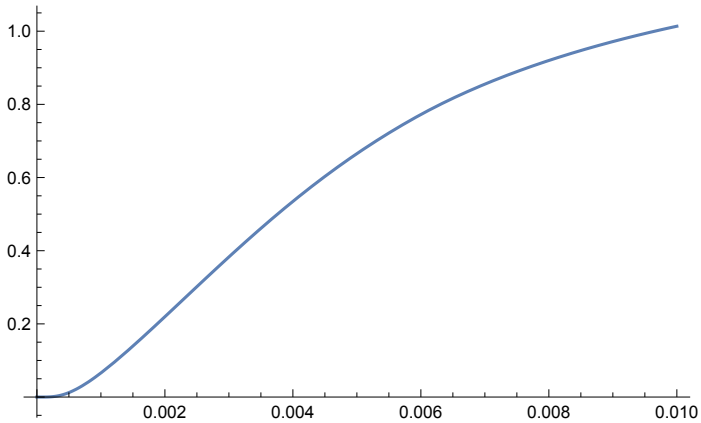

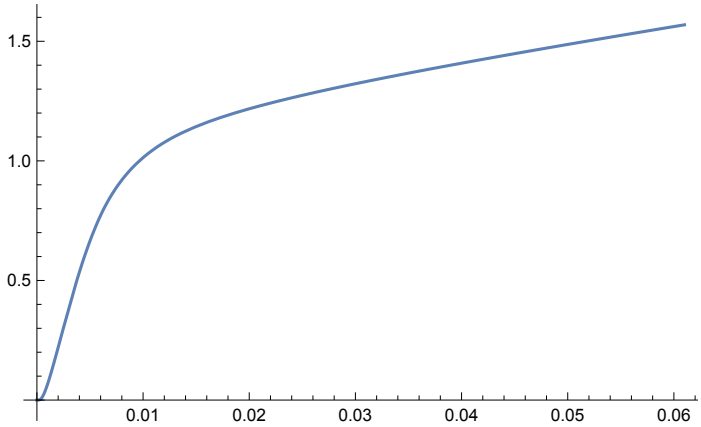

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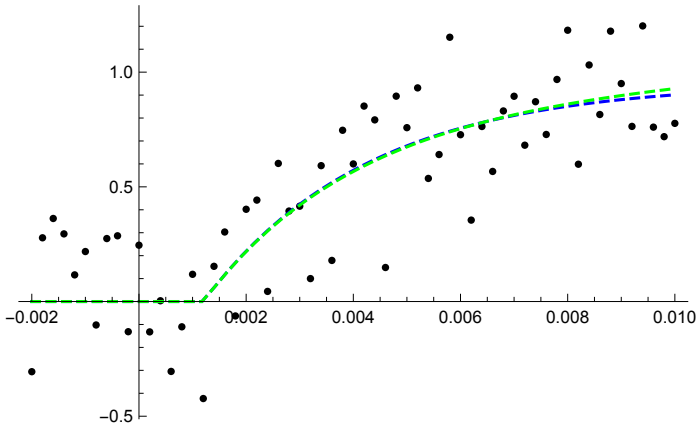


```
Mono: chi2 = 3.02288     d = 3.02288     a = 0.955068     t = 0.00306312
Bi: ratio chi2Mono/chi2Bi = 0.998677     d = 0.0012     a =
 1.65617     a1 = 0.815256     t1 =0.00278526     t2 = 0.0455715
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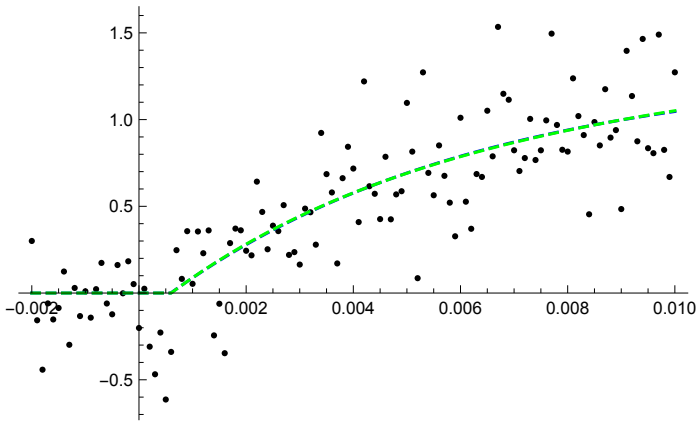


```
Mono: chi2 = 7.94521     d = 7.94521     a = 1.31166     t = 0.00587919
Bi: ratio chi2Mono/chi2Bi = 0.999813     d = 0.0006     a =
 1.62037     a1 = 0.799279     t1 =0.00439824     t2 = 0.0171839
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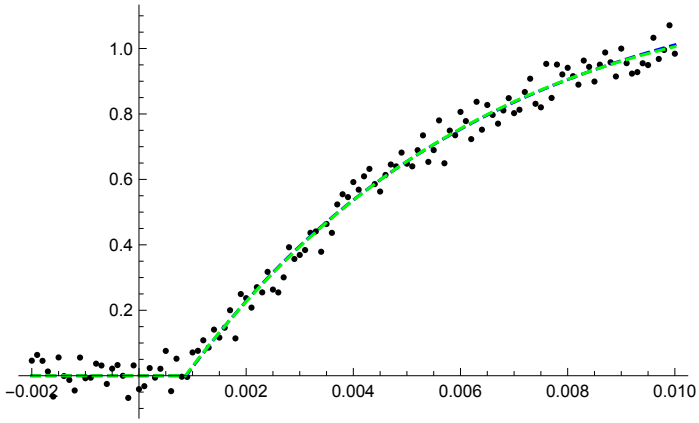


```
Mono: chi2 = 0.172691     d = 0.172691     a = 1.25782     t = 0.00559942
Bi: ratio chi2Mono/chi2Bi = 1.0096     d = 0.000865382     a =
 0.657352     a1 = 2.64592     t1 =0.00806645     t2 = 0.0181111
-------------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 4.53549
  uM          -------------------------------------------------------
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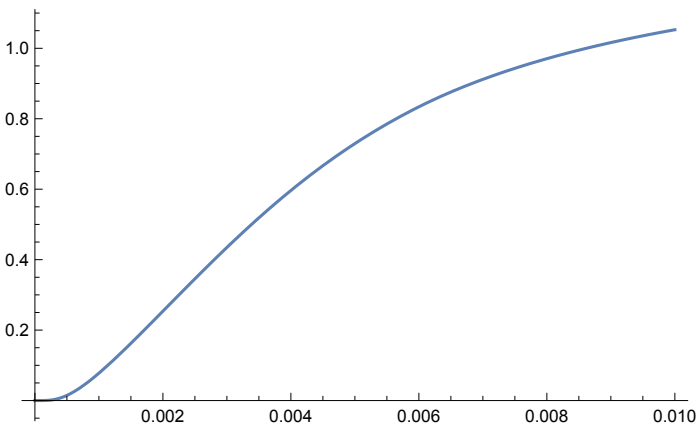
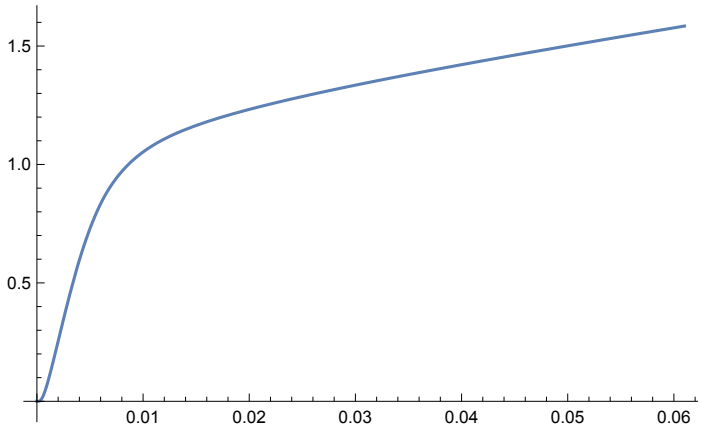
```





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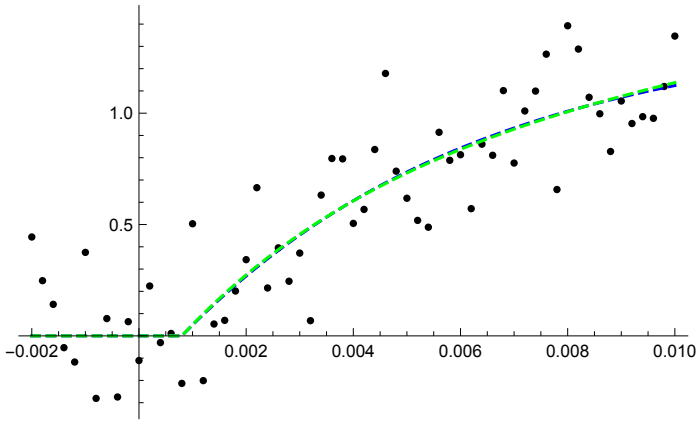


```
Mono: chi2 = 2.70757     d = 2.70757     a = 1.39297     t = 0.00559194
Bi: ratio chi2Mono/chi2Bi = 0.999449     d = 0.0008     a =
 2.30634     a1 = 0.758282     t1 =0.00376478     t2 = 0.0271609
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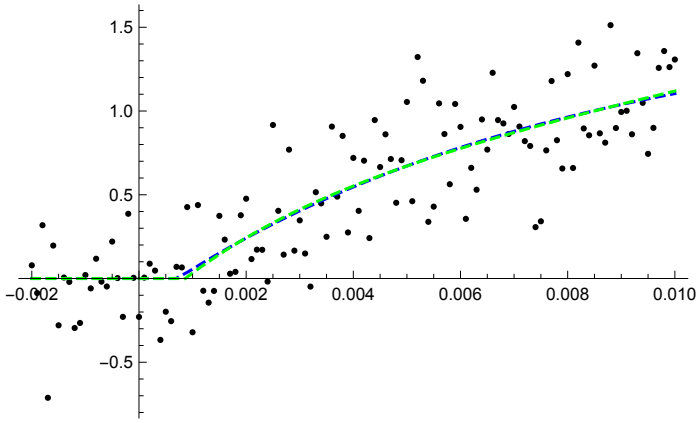


```
Mono: chi2 = 8.00372     d = 8.00372     a = 1.5771     t = 0.00770626
Bi: ratio chi2Mono/chi2Bi = 1.00151     d = 0.000864885
      a = 10.13     a1 = 0.470312     t1 =0.0027773     t2 = 0.127849
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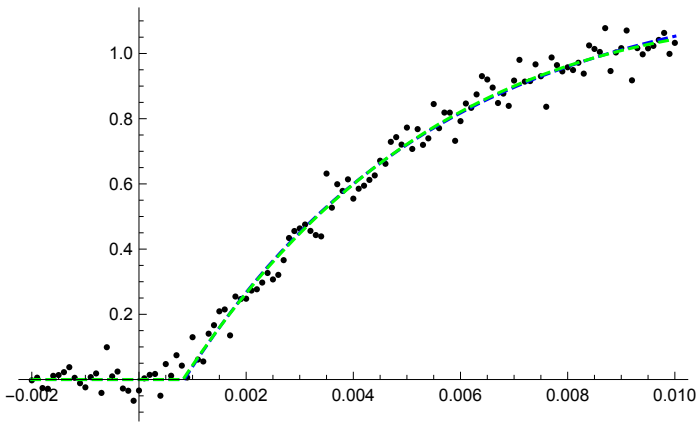

```
Mono: chi2 = 0.188423     d = 0.188423     a = 1.22836     t = 0.00470489
Bi: ratio chi2Mono/chi2Bi = 1.02842     d = 0.000821367     a =
 0.501992     a1 = 3.10208     t1 =0.00746723     t2 = 0.0157015
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 4.79194
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
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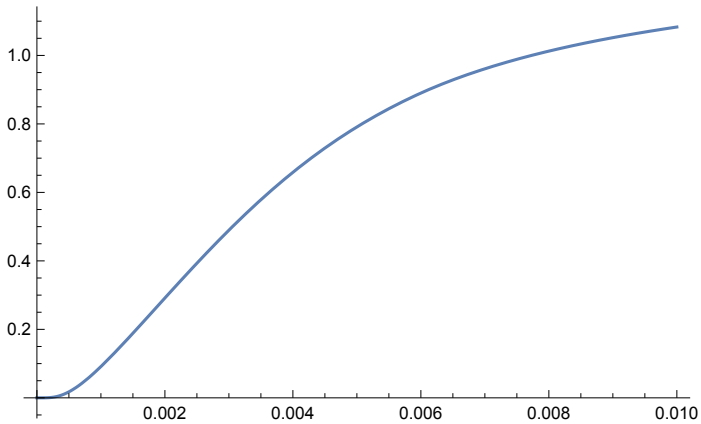

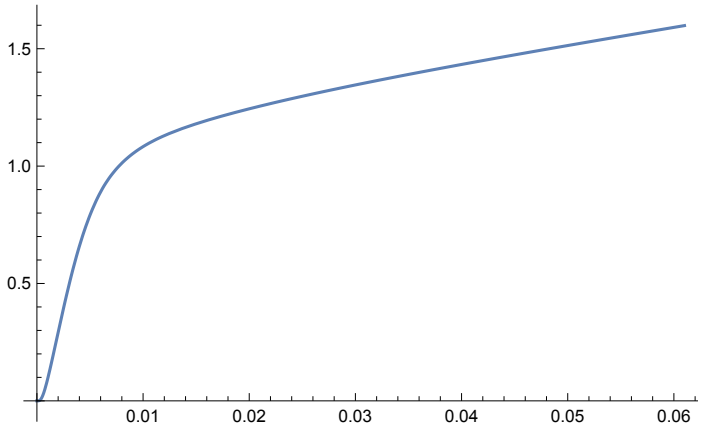


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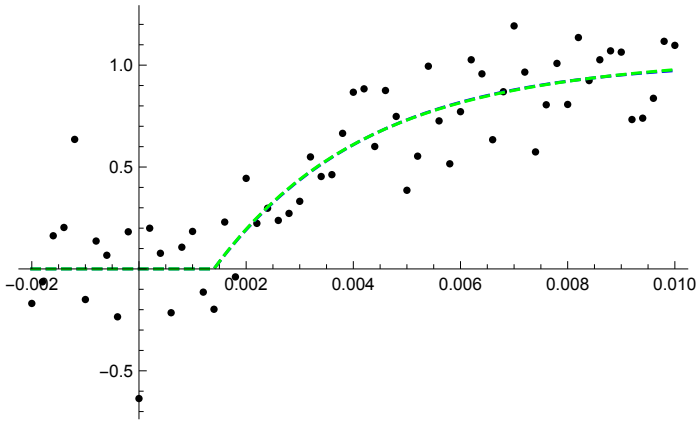


```
Mono: chi2 = 2.45144     d = 2.45144     a = 1.02481     t = 0.00287632

Bi: ratio chi2Mono/chi2Bi = 1.0002     d = 0.0014     a =
 2.44723     a1 = 0.958805     t1 =0.00270113     t2 = 0.214003

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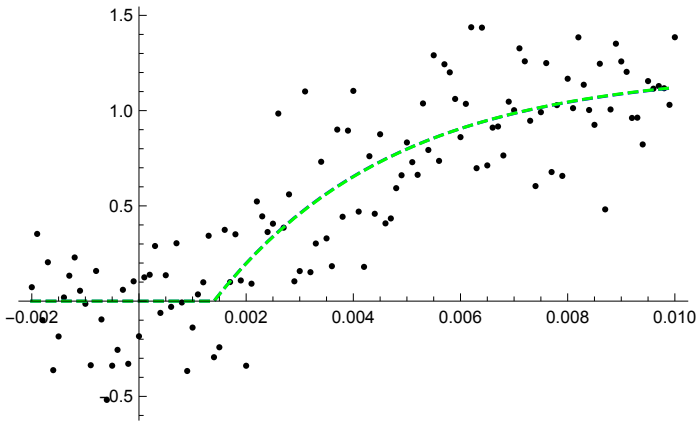


```
Mono: chi2 = 7.62187     d = 7.62187     a = 1.21292     t = 0.00334996
Bi: ratio chi2Mono/chi2Bi = 1.00008     d = 0.0014     a =
 1.03819     a1 = 1.23967     t1 =0.00343079     t2 = 0.0941701
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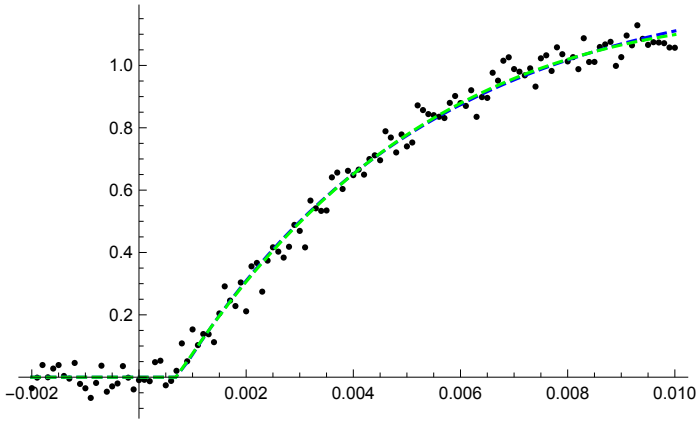


```
Mono: chi2 = 0.176344     d = 0.176344     a = 1.28089     t = 0.00459608
Bi: ratio chi2Mono/chi2Bi = 1.06295     d = 0.000706326     a =
 0.489878     a1 = 3.39913     t1 =0.00743926     t2 = 0.0152796
--------------------------------------------------------------------------------
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----------------     Ca = 5.53376
  uM         -------------------------------------------------------
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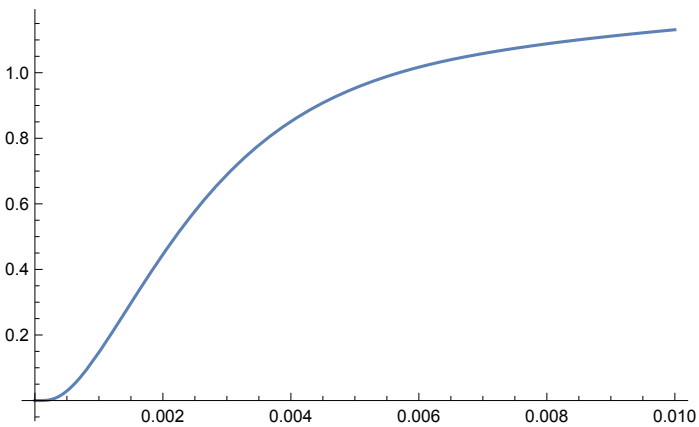

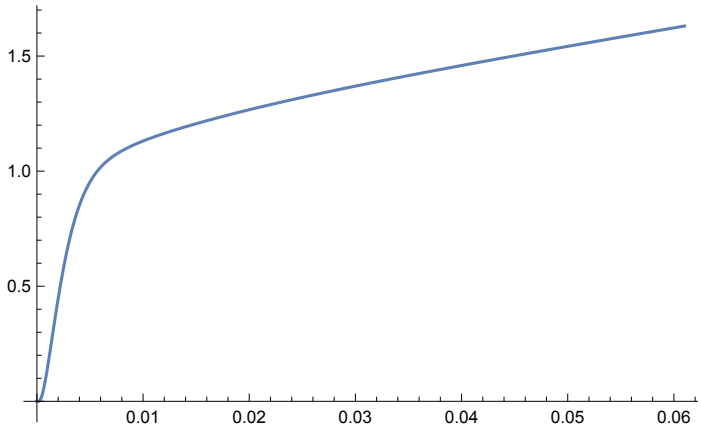

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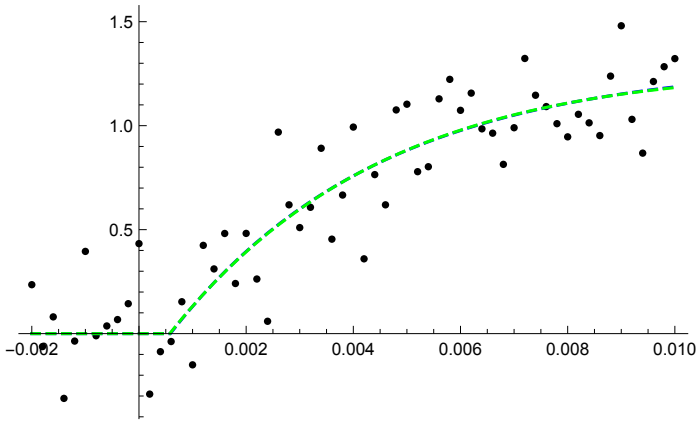


```
Mono: chi2 = 2.38178     d = 2.38178     a = 1.30487     t = 0.00392167
Bi: ratio chi2Mono/chi2Bi = 1.00007     d = 0.000574635     a =
 1.22813     a1 = 2.34195     t1 =0.00480186     t2 = 0.00689414
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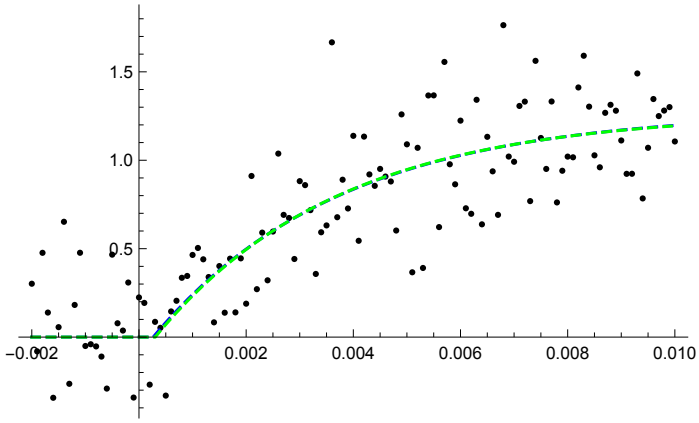


```
Mono: chi2 = 8.84202     d = 8.84202     a = 1.27665     t = 0.00350941
Bi: ratio chi2Mono/chi2Bi = 0.999889     d = 0.000302609     a =
 1.2697     a1 = 1.03569     t1 =0.00342775     t2 = 0.00342775
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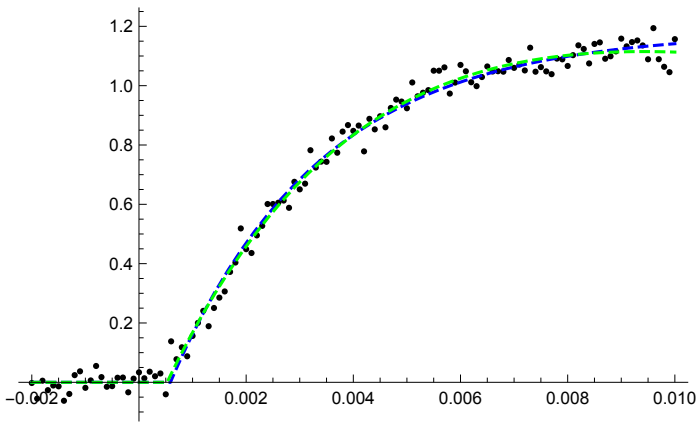

```
Mono: chi2 = 0.162945     d = 0.162945     a = 1.18184     t = 0.00278954
Bi: ratio chi2Mono/chi2Bi = 1.09296     d = 0.000525576     a =
 0.601199     a1 = 3.72048     t1 =0.00517654     t2 = 0.00915883
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----------------     Ca = 5.7741
  uM         -------------------------------------------------------
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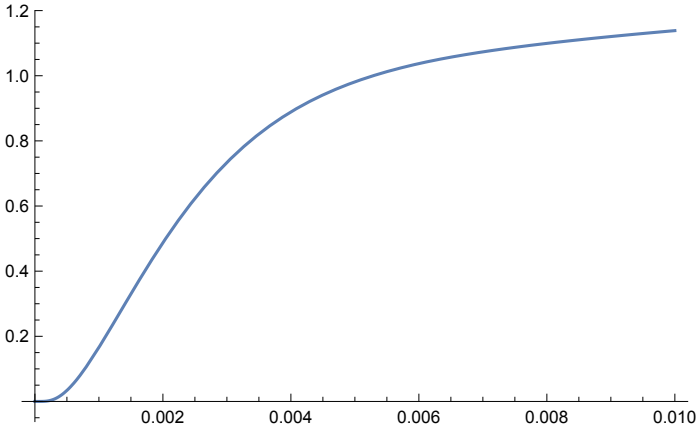

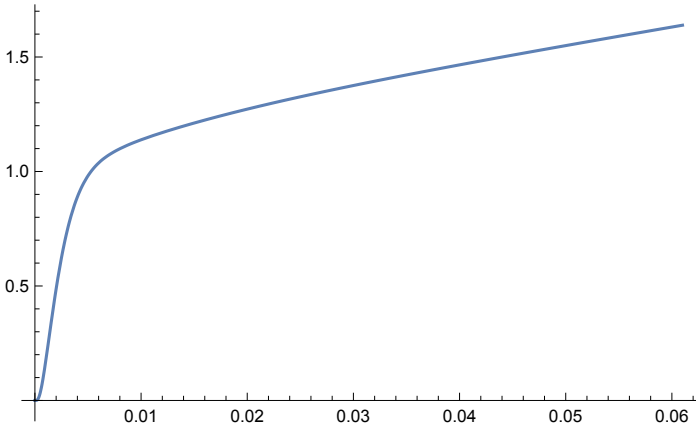


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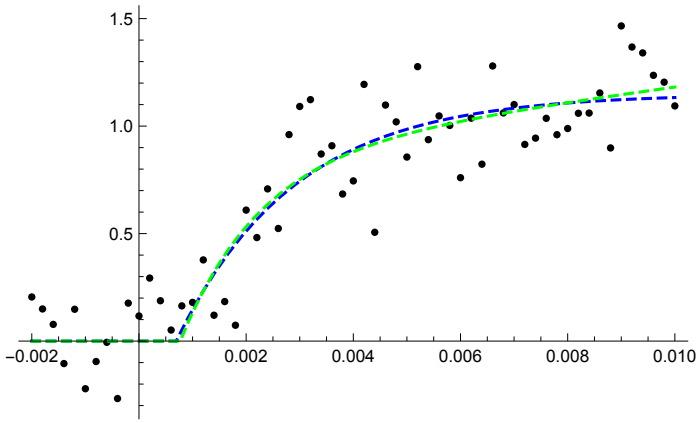


```
Mono: chi2 = 2.02558     d = 2.02558     a = 1.14997     t = 0.00221198
Bi: ratio chi2Mono/chi2Bi = 1.01662     d = 0.000771772
      a = 18.334     a1 = 0.86576     t1 =0.00147186     t2 = 0.503244
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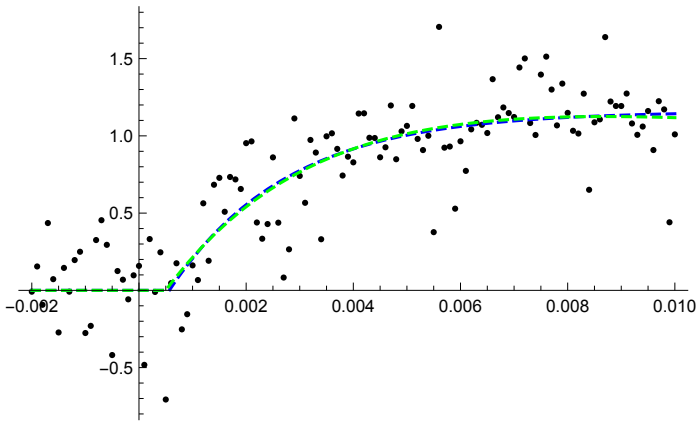


```
Mono: chi2 = 7.94786     d = 7.94786     a = 1.15893     t = 0.00219887
Bi: ratio chi2Mono/chi2Bi = 1.00265     d = 0.0005     a =
 0.72833     a1 = 1.73084     t1 =0.00317028     t2 = 0.0127514
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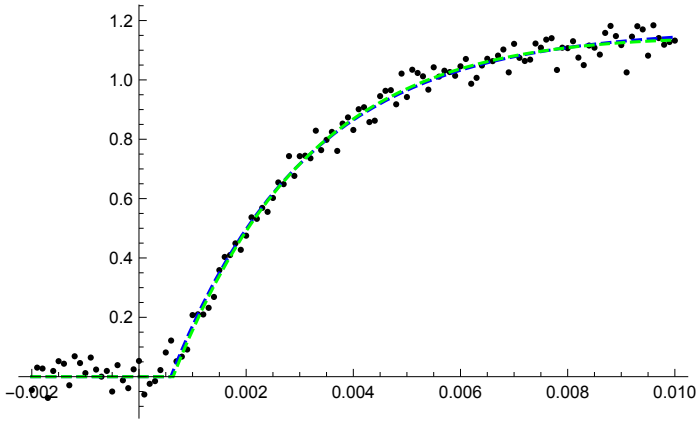


```
Mono: chi2 = 0.170357     d = 0.170357     a = 1.1731     t = 0.00254581
Bi: ratio chi2Mono/chi2Bi = 1.01911     d = 0.000636846     a =
 0.860762     a1 = 1.24489     t1 =0.00263366     t2 = 0.0431252
------------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 6.02652
  uM         -------------------------------------------------------
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```

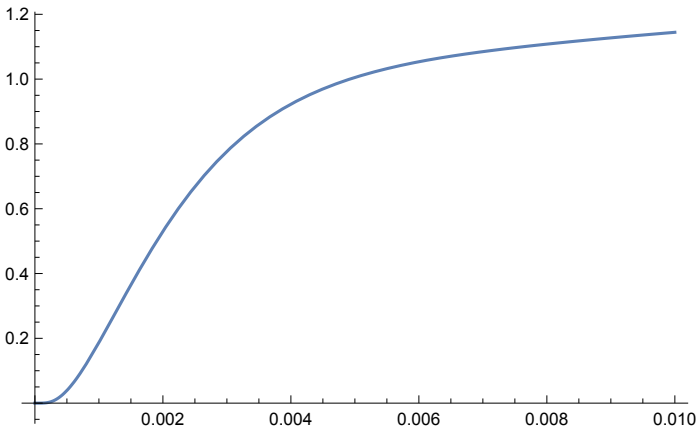

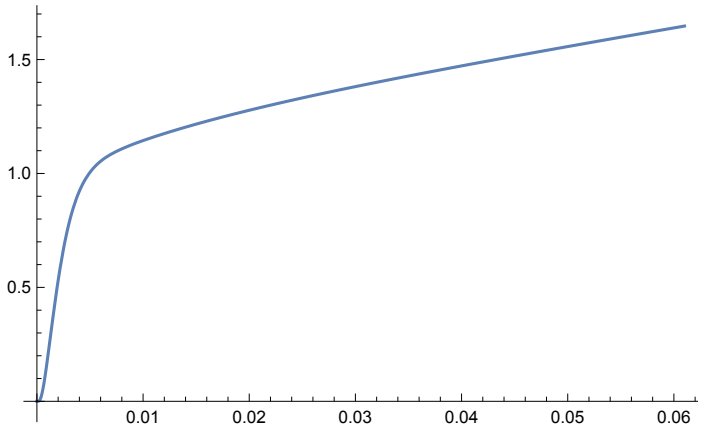

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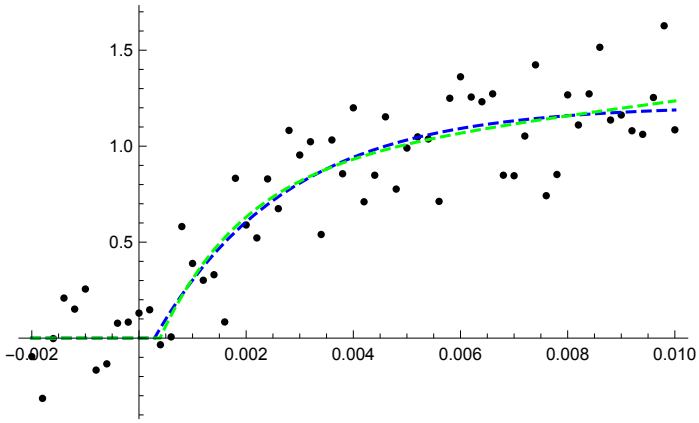


```
Mono: chi2 = 2.48802     d = 2.48802     a = 1.21213     t = 0.00246823
Bi: ratio chi2Mono/chi2Bi = 1.011     d = 0.000391903     a =
 15.4021     a1 = 0.883754     t1 =0.00154565     t2 = 0.389736
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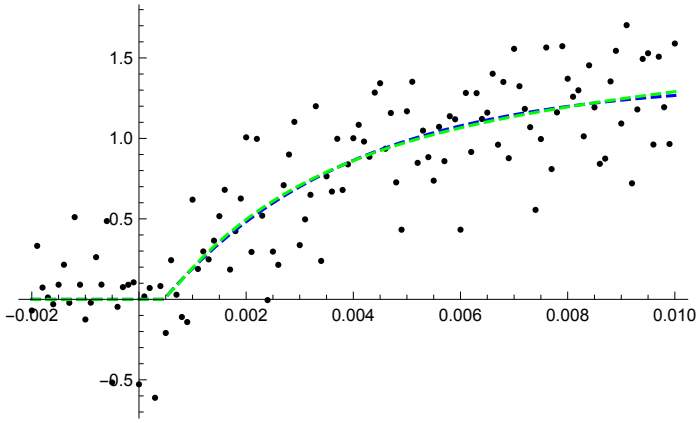


```
Mono: chi2 = 8.89155     d = 8.89155     a = 1.35438     t = 0.00348218
Bi: ratio chi2Mono/chi2Bi = 1.00168     d = 0.0005     a =
 2.17868     a1 = 0.903496     t1 =0.00238337     t2 = 0.0249729
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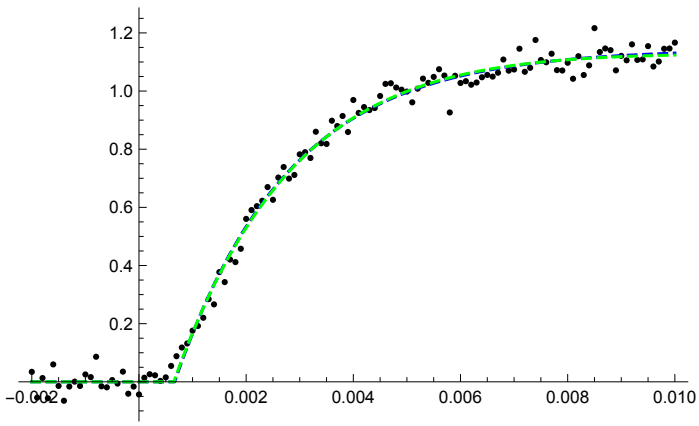

```
Mono: chi2 = 0.15579     d = 0.15579     a = 1.1444     t = 0.00212205
Bi: ratio chi2Mono/chi2Bi = 1.00894     d = 0.000650623     a =
 1.11624     a1 = 1.85524     t1 =0.00255533     t2 = 0.00360441
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 6.29189
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
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```

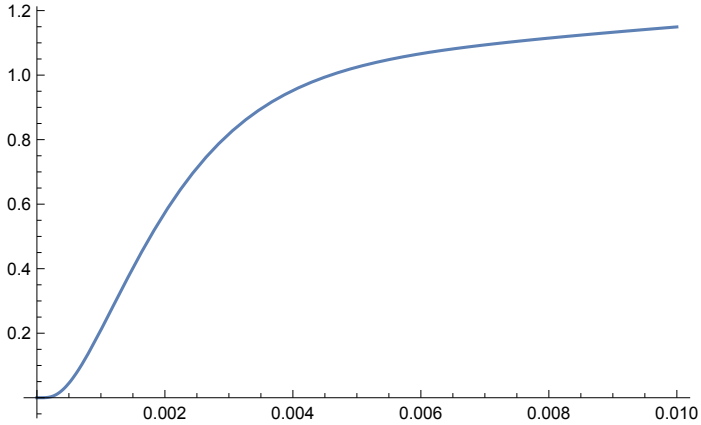

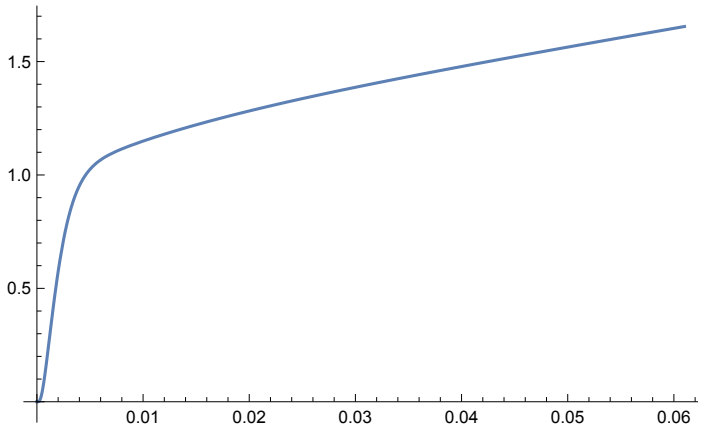


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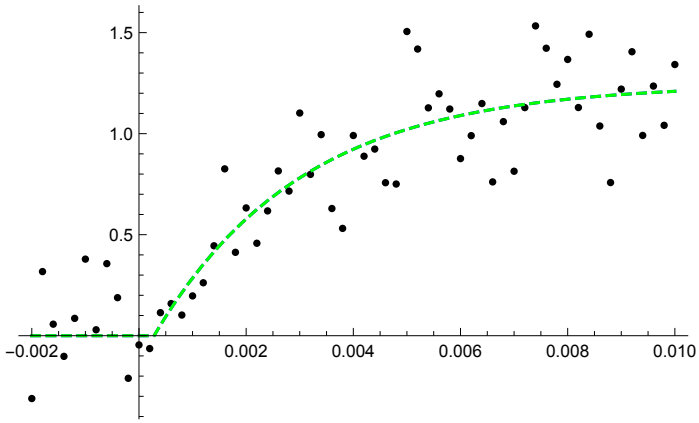


```
Mono: chi2 = 2.64365     d = 2.64365     a = 1.2462     t = 0.00275533

Bi: ratio chi2Mono/chi2Bi = 1.     d = 0.000282425     a =
 1.2462     a1 = 0.775785     t1 =0.00275533     t2 = 0.00275533

------------------------------------------------------------------------ C10

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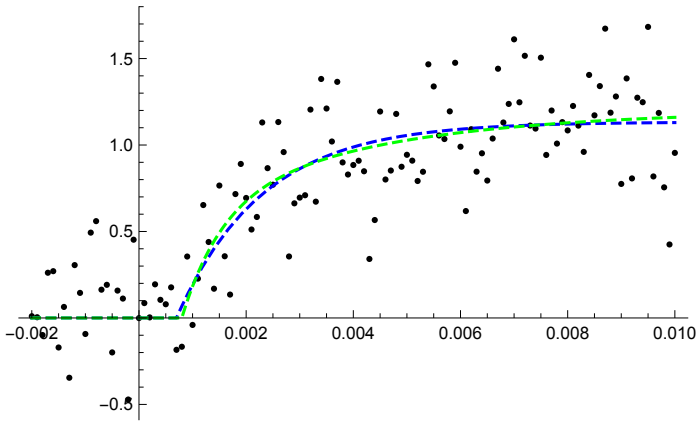


```
Mono: chi2 = 8.21721     d = 8.21721     a = 1.1331     t = 0.00160212
Bi: ratio chi2Mono/chi2Bi = 1.0089     d = 0.0008     a =
 1.20108     a1 = 0.630865     t1 =0.000729983     t2 = 0.00349515
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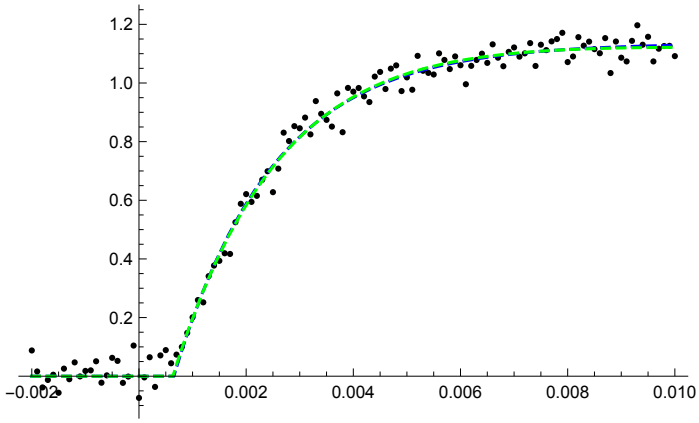
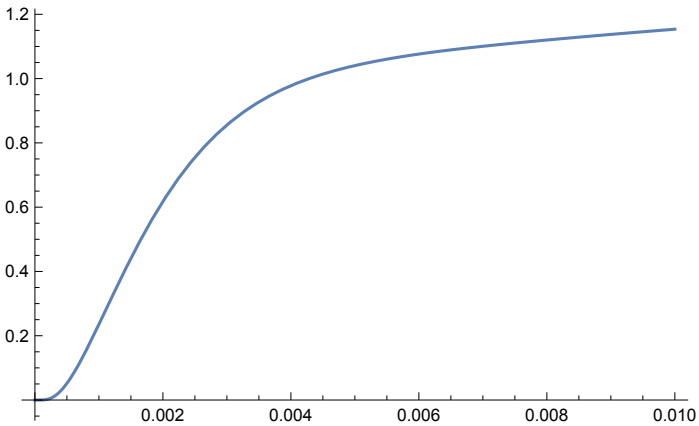
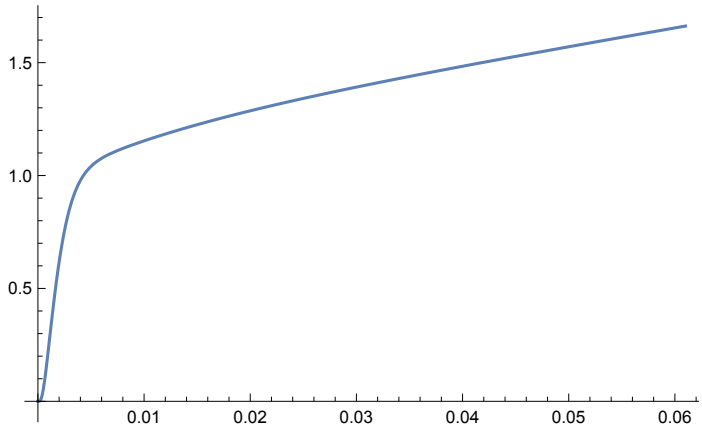



```
Mono: chi2 = 0.194673     d = 0.194673     a = 1.13574     t = 0.00184861
Bi: ratio chi2Mono/chi2Bi = 1.00704     d = 0.000633267     a =
 1.11422     a1 = 2.51273     t1 =0.00232234     t2 = 0.00284279
-------------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 6.57096
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
  --------------------------
```





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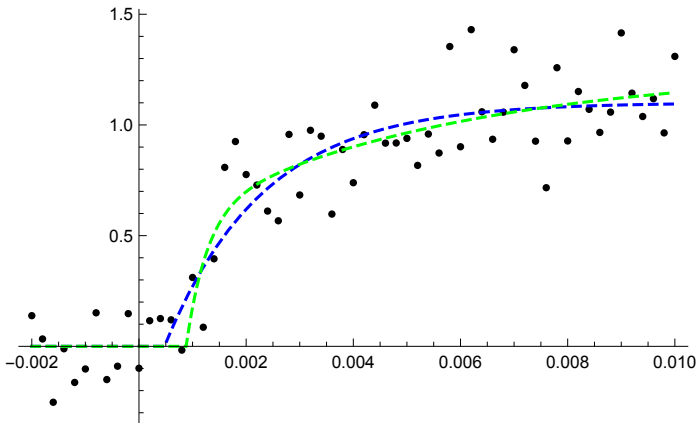


```
Mono: chi2 = 1.71543     d = 1.71543     a = 1.10083     t = 0.00184036
Bi: ratio chi2Mono/chi2Bi = 1.07348     d = 0.000880036     a =
 1.2557     a1 = 0.604423     t1 =0.000389015     t2 = 0.00512733
------------------------------------------------------------------------ C10
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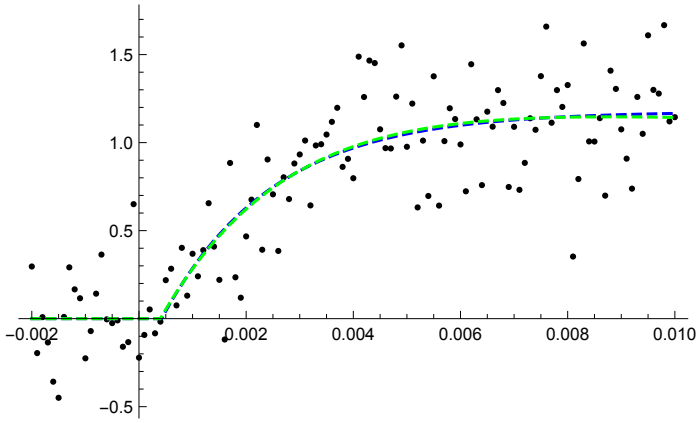


```
Mono: chi2 = 8.19703     d = 8.19703     a = 1.17709     t = 0.00206022
Bi: ratio chi2Mono/chi2Bi = 1.00245     d = 0.0004     a =
 1.0763     a1 = 2.76198     t1 =0.00296102     t2 = 0.00423487
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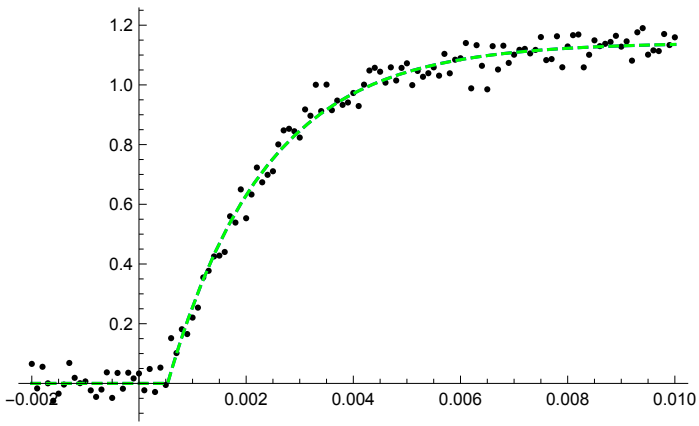
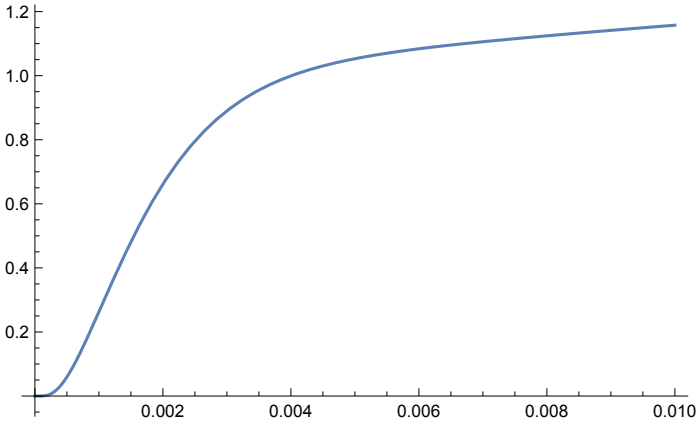
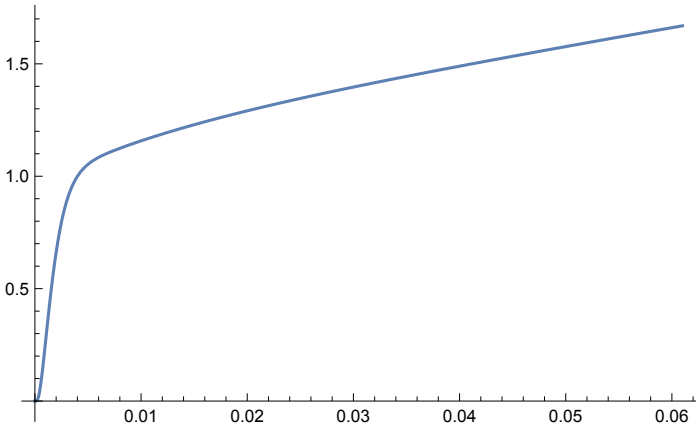


```
Mono: chi2 = 0.191838     d = 0.191838     a = 1.14163     t = 0.00182266
Bi: ratio chi2Mono/chi2Bi = 1.00001     d = 0.000535635
      a = 1.4485     a1 = 1.13978     t1 =0.00181831     t2 = 1.39103
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 6.86435
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
  -------------------------
```



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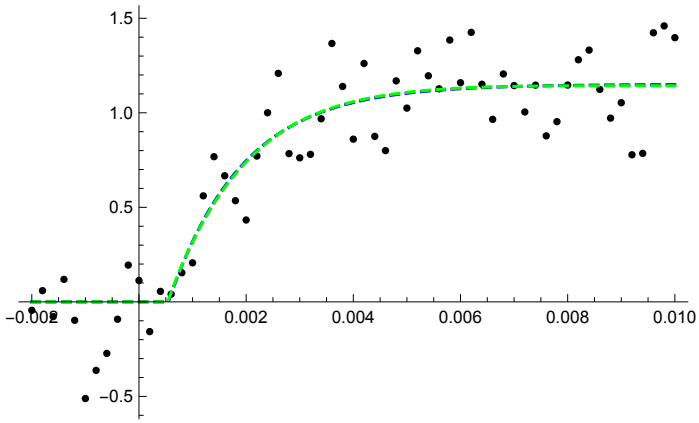


```
Mono: chi2 = 2.32822     d = 2.32822     a = 1.15     t = 0.00138696

Bi: ratio chi2Mono/chi2Bi = 1.00025     d = 0.000535737     a =
 1.13982     a1 = 3.44012     t1 =0.00174398     t2 = 0.00195476

------------------------------------------------------------------------ C10

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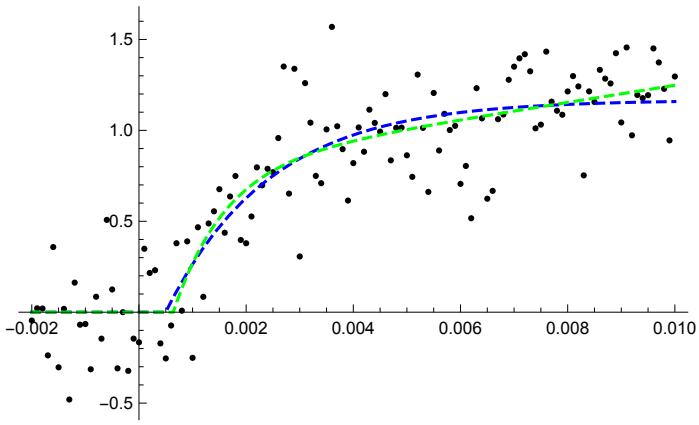


```
Mono: chi2 = 6.65253     d = 6.65253     a = 1.16716     t = 0.00194183
Bi: ratio chi2Mono/chi2Bi = 1.03609     d = 0.00064092     a =
 22.0292     a1 = 0.805194     t1 =0.000959973     t2 = 0.44404
------------------------------------------------------------------------- D
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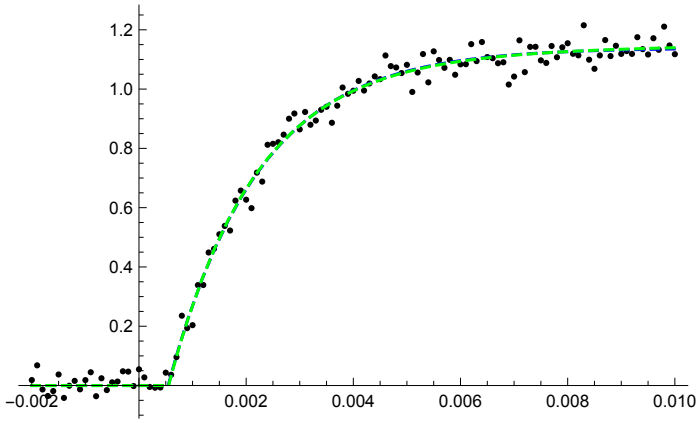
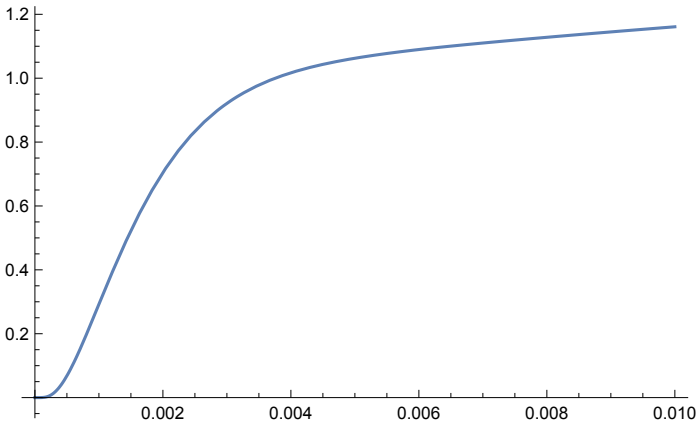
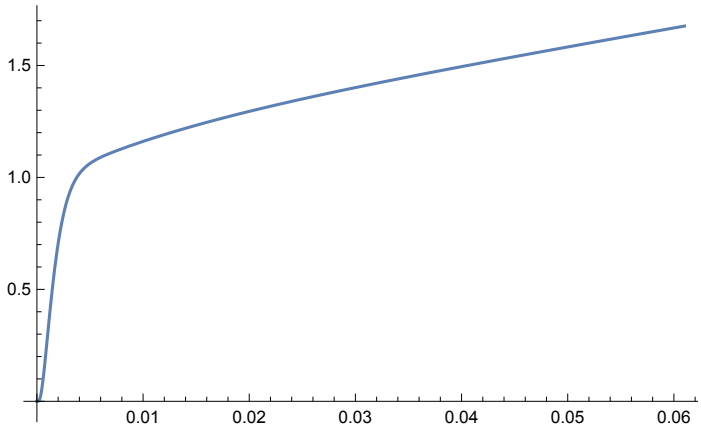



```
Mono: chi2 = 0.154716     d = 0.154716     a = 1.13935     t = 0.00166886
Bi: ratio chi2Mono/chi2Bi = 1.00209     d = 0.000553083     a =
 2.33633     a1 = 1.11886     t1 =0.00162122     t2 = 0.473364
-------------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 7.17282
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
  --------------------------
```





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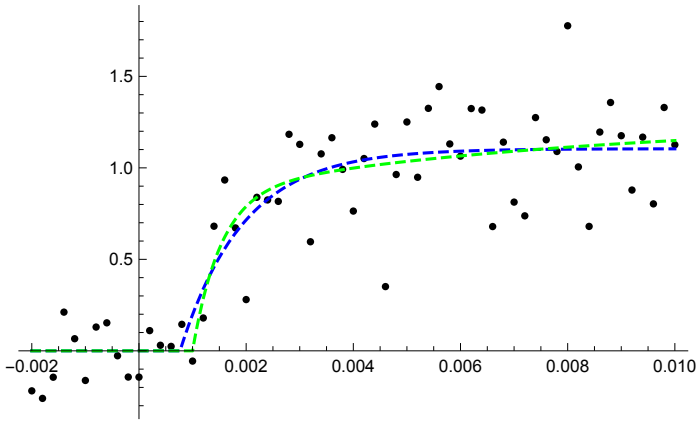


```
Mono: chi2 = 3.38299     d = 3.38299     a = 1.10442     t = 0.00118234
Bi: ratio chi2Mono/chi2Bi = 1.01712     d = 0.001     a =
 1.25992     a1 = 0.865439     t1 =0.000524411     t2 = 0.00708493
------------------------------------------------------------------------ C10
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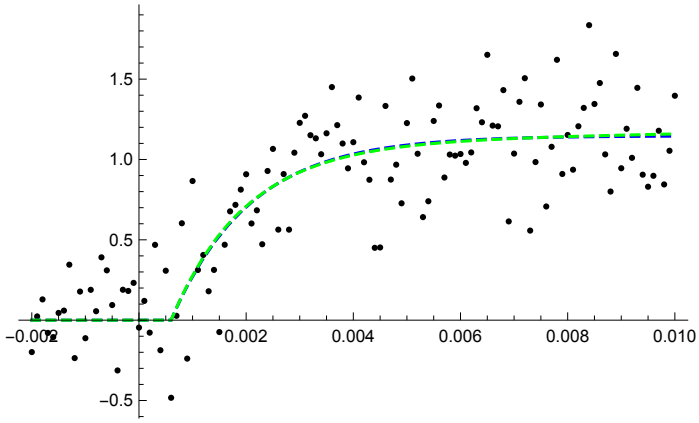


```
Mono: chi2 = 8.95425     d = 8.95425     a = 1.14703     t = 0.00146798
Bi: ratio chi2Mono/chi2Bi = 0.999343     d = 0.0006     a =
 1.40579     a1 = 1.09542     t1 =0.00137911     t2 = 0.0403489
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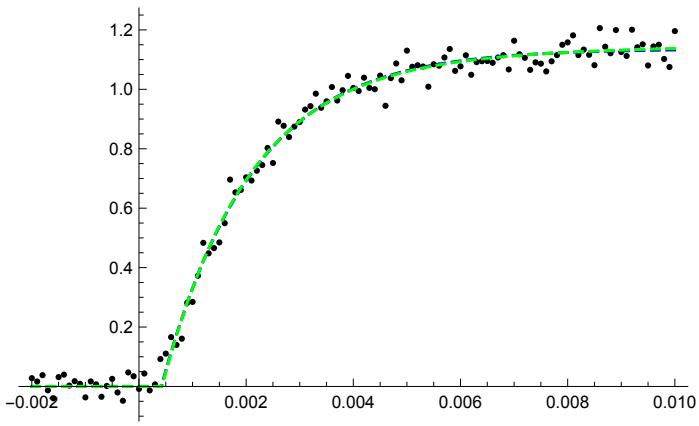
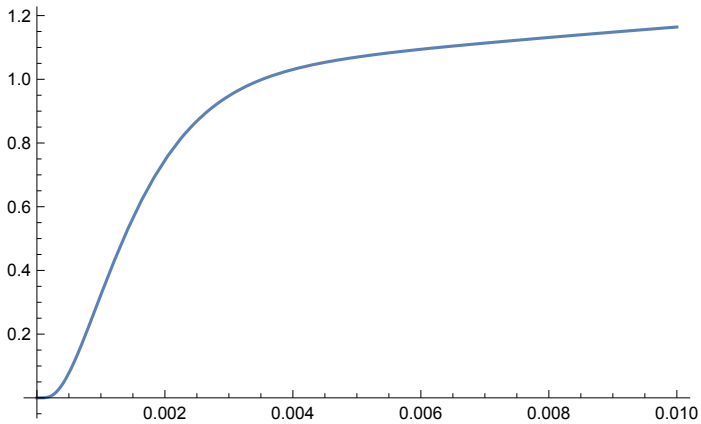
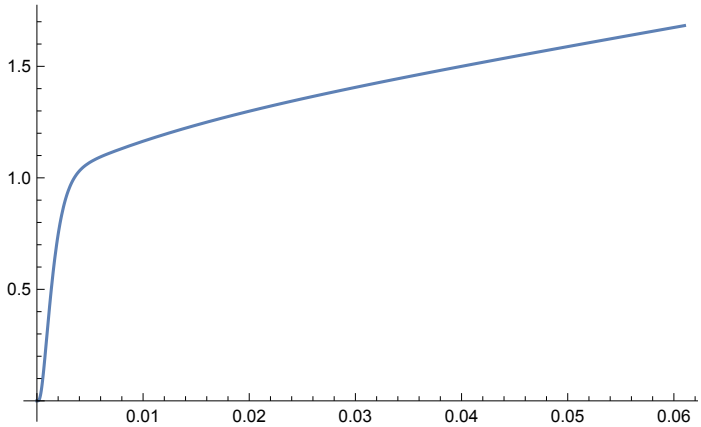


```
Mono: chi2 = 0.158763     d = 0.158763     a = 1.13641     t = 0.00167636
Bi: ratio chi2Mono/chi2Bi = 1.00278     d = 0.000428162
      a = 2.2273     a1 = 1.11304     t1 =0.00162088     t2 = 0.382538
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 7.4968
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
  -------------------------
```



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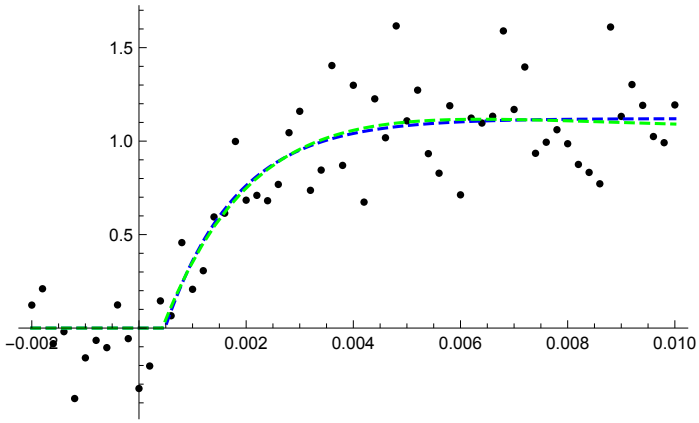


```
Mono: chi2 = 2.77367     d = 2.77367     a = 1.12057     t = 0.00132857

Bi: ratio chi2Mono/chi2Bi = 1.00463     d = 0.000437015     a =
 1.05904     a1 = 7.21246     t1 =0.00226661     t2 = 0.00251988

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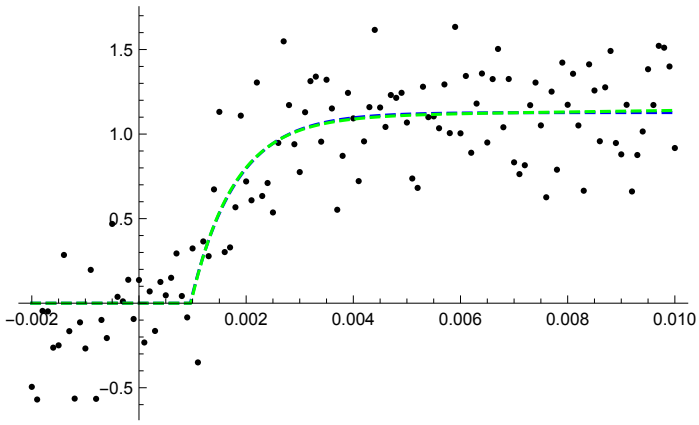


```
Mono: chi2 = 8.60247     d = 8.60247     a = 1.12725     t = 0.000846613
Bi: ratio chi2Mono/chi2Bi = 1.00041     d = 0.000968192     a =
 3.60494     a1 = 1.09987     t1 =0.000800052     t2 = 0.560648
------------------------------------------------------------------------- D
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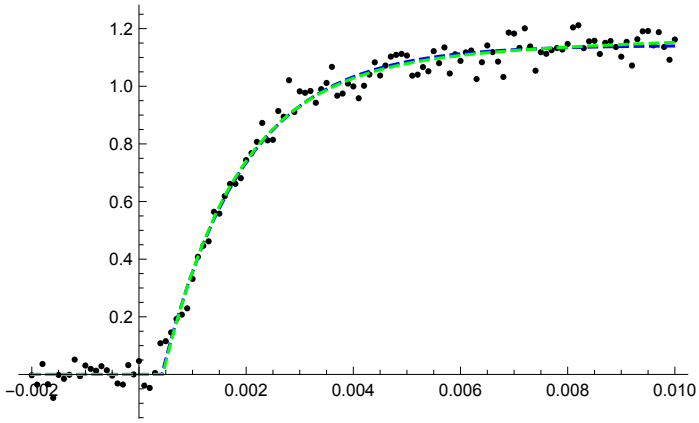
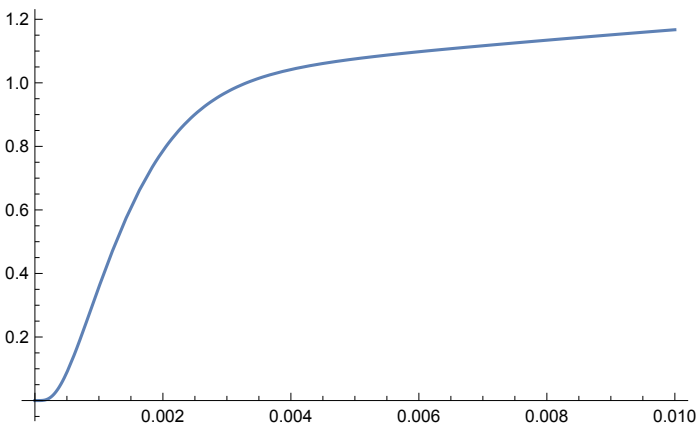
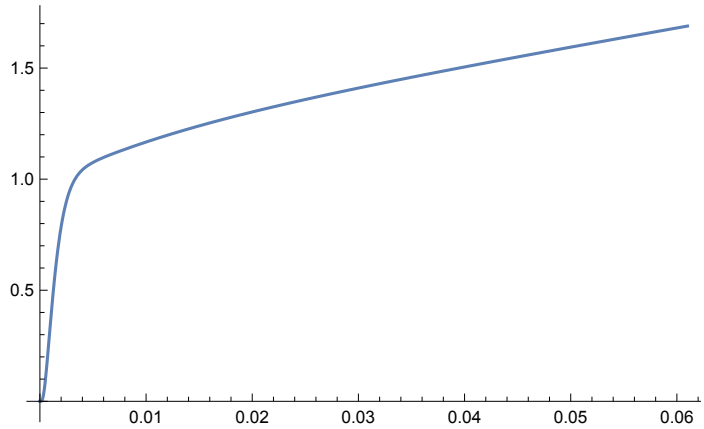



```
Mono: chi2 = 0.187779     d = 0.187779     a = 1.14191     t = 0.00152007
Bi: ratio chi2Mono/chi2Bi = 1.0168     d = 0.000445854     a =
 3.02516     a1 = 1.09135     t1 =0.00140322     t2 = 0.291745
--------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 7.83735
  uM         -------------------------------------------------------
--------------------------------------------------------------------------------
  -------------------------
```





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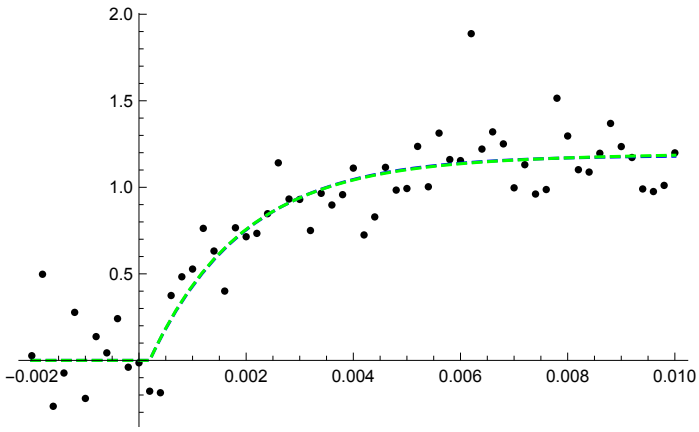


```
Mono: chi2 = 2.23724     d = 2.23724     a = 1.18436     t = 0.00177435
Bi: ratio chi2Mono/chi2Bi = 0.999099     d = 0.0002     a =
 1.29083     a1 = 1.15025     t1 =0.00170758     t2 = 0.0302958
------------------------------------------------------------------------- C10
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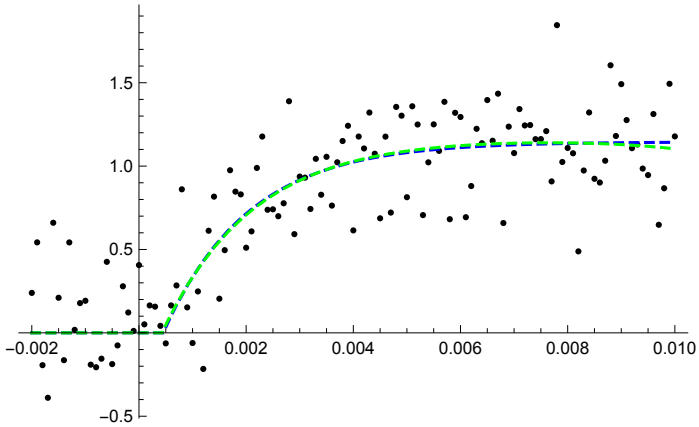


```
Mono: chi2 = 8.51468     d = 8.51468     a = 1.14535     t = 0.00157872
Bi: ratio chi2Mono/chi2Bi = 1.00141     d = 0.00043035     a =
 1.17269     a1 = 1.17246     t1 =0.00169378     t2 = -0.00169736
------------------------------------------------------------------------ D
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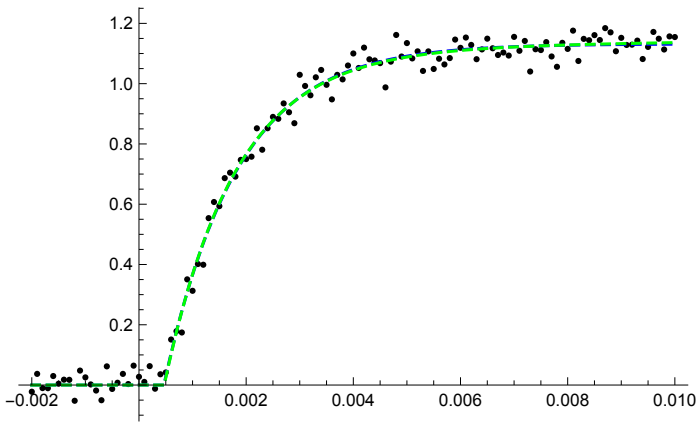

```
Mono: chi2 = 0.154244     d = 0.154244     a = 1.13205     t = 0.00136586
Bi: ratio chi2Mono/chi2Bi = 1.00333     d = 0.000471732     a =
 2.24596     a1 = 1.11404     t1 =0.00132648     t2 = 0.465532
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 8.19526
  uM         -------------------------------------------------------
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```

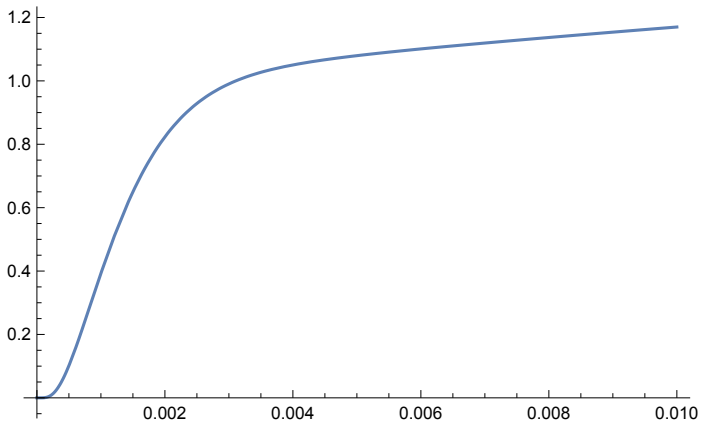

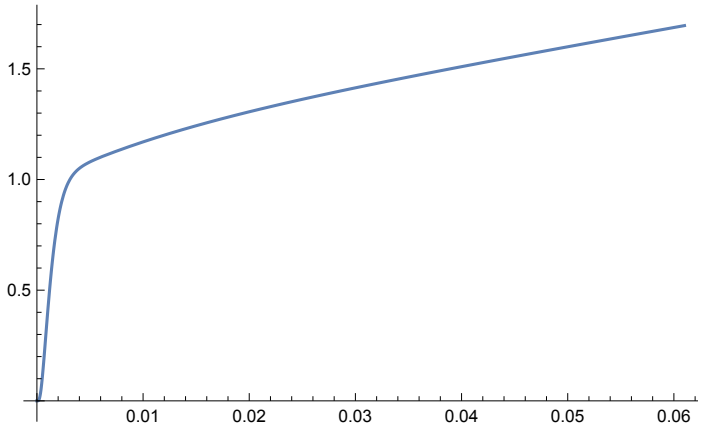


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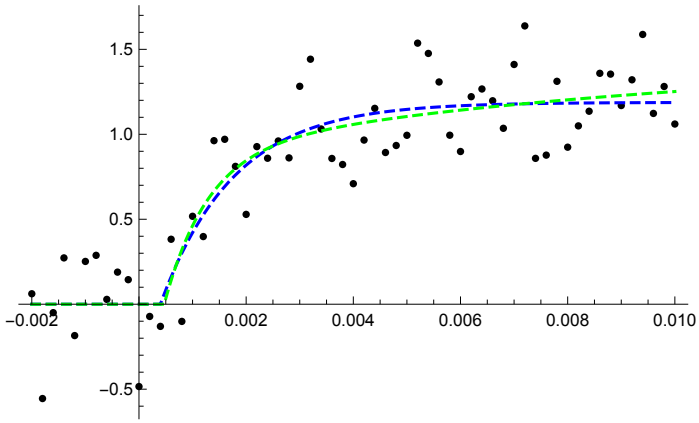


```
Mono: chi2 = 3.31868     d = 3.31868     a = 1.18792     t = 0.00137013
Bi: ratio chi2Mono/chi2Bi = 1.01944     d = 0.00047145     a =
 1.45656     a1 = 0.892684     t1 =0.000800335     t2 = 0.00941627
------------------------------------------------------------------------ C10
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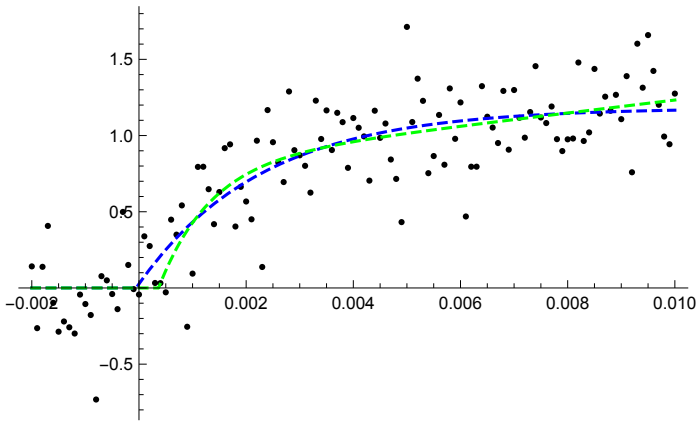


```
Mono: chi2 = 7.70098     d = 7.70098     a = 1.18146     t = 0.00230616
Bi: ratio chi2Mono/chi2Bi = 1.01632     d = 0.000366365     a =
 17.0816     a1 = 0.819561     t1 =0.00094488     t2 = 0.374124
------------------------------------------------------------------------- D
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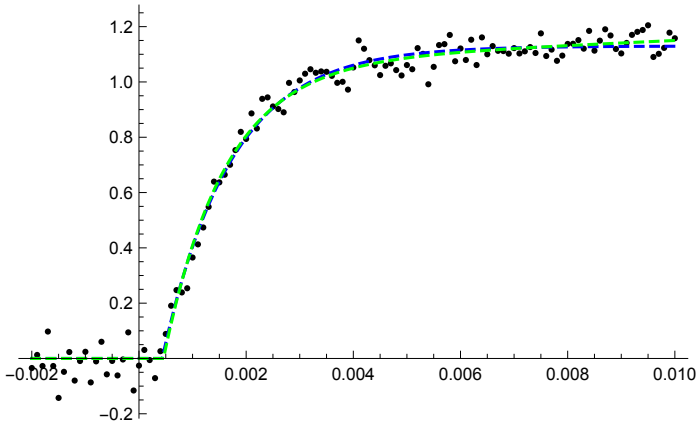


```
Mono: chi2 = 0.245857     d = 0.245857     a = 1.12973     t = 0.00127693
Bi: ratio chi2Mono/chi2Bi = 1.0386     d = 0.000457903     a =
 4.29936     a1 = 1.06613     t1 =0.00113781     t2 = 0.362366
--------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 8.57176
  uM          -------------------------------------------------------
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  --------------------------
```

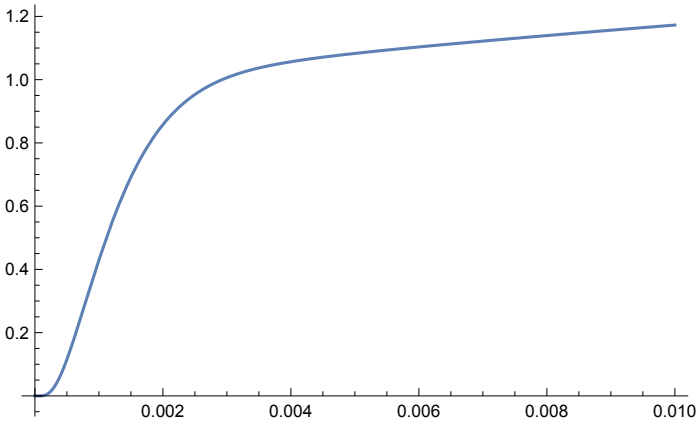

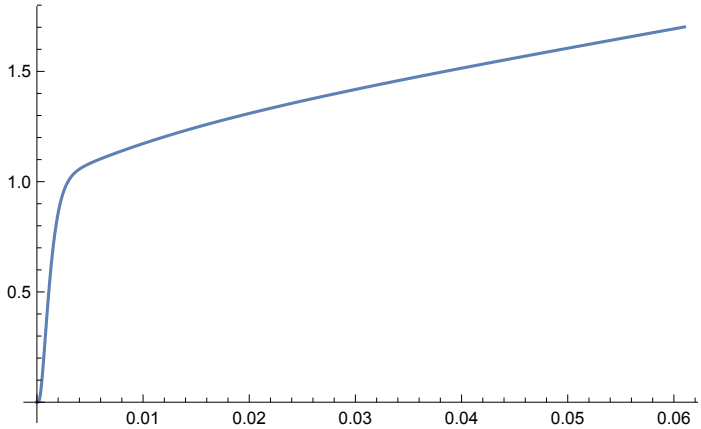

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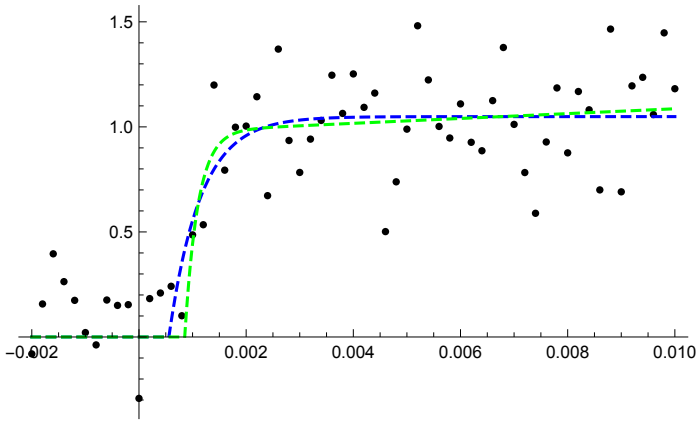


```
Mono: chi2 = 3.07134     d = 3.07134     a = 1.04884     t = 0.000587962
Bi: ratio chi2Mono/chi2Bi = 1.02951     d = 0.000853651     a =
 7.38291     a1 = 0.980227     t1 =0.000244566     t2 = 0.548038
------------------------------------------------------------------------ C10
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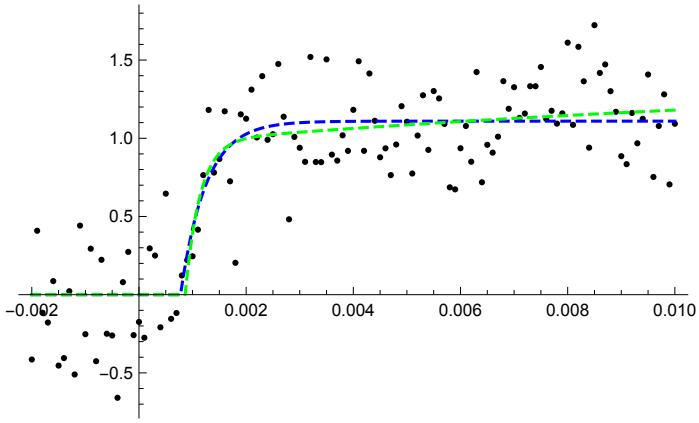


```
Mono: chi2 = 9.18549     d = 9.18549     a = 1.10943     t = 0.000471361
Bi: ratio chi2Mono/chi2Bi = 1.01927     d = 0.000862022     a =
 1.44778     a1 = 0.982509     t1 =0.000275671     t2 = 0.0165088
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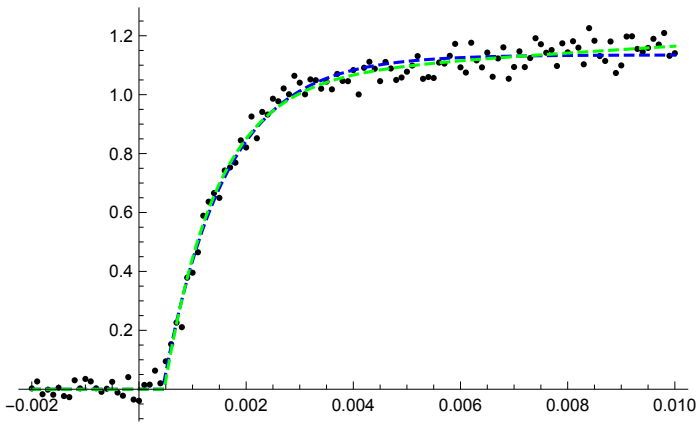

```
Mono: chi2 = 0.163026     d = 0.163026     a = 1.13465     t = 0.00114883
Bi: ratio chi2Mono/chi2Bi = 1.14206     d = 0.000472507     a =
 4.82823     a1 = 1.05394     t1 =0.000979102     t2 = 0.319897
-------------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 8.96782
  uM         -------------------------------------------------------
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  --------------------------
```

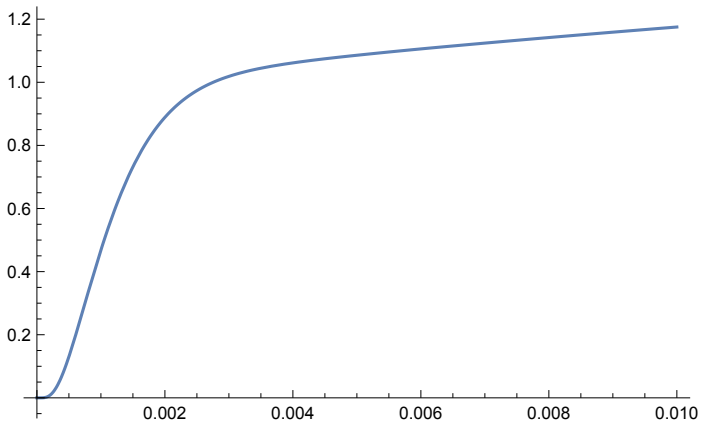

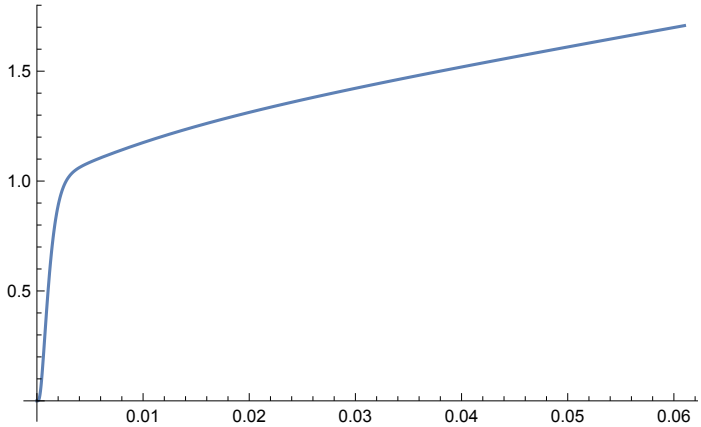


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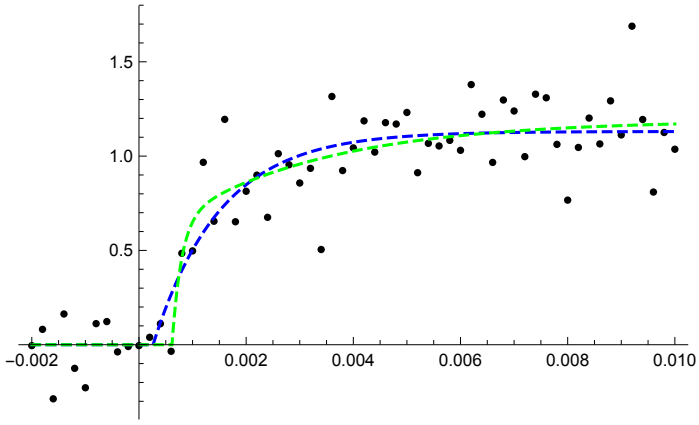


```
Mono: chi2 = 2.08769     d = 2.08769     a = 1.13054     t = 0.00125175
Bi: ratio chi2Mono/chi2Bi = 1.1112     d = 0.000616424     a =
 1.19067     a1 = 0.65761     t1 =0.0001757     t2 = 0.00287639
------------------------------------------------------------------------- C10
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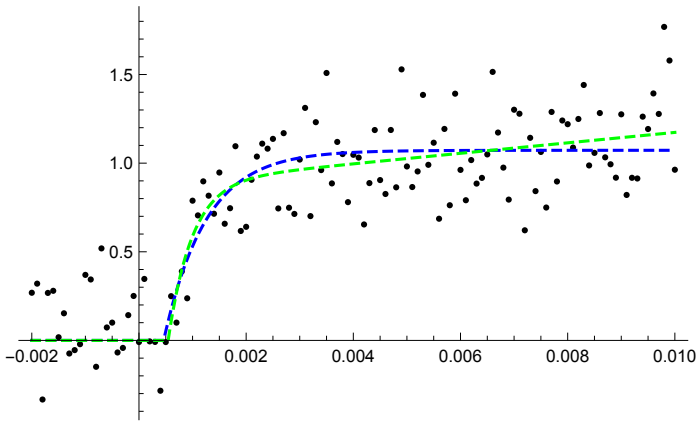


```
Mono: chi2 = 6.19191     d = 6.19191     a = 1.07245     t = 0.000788426
Bi: ratio chi2Mono/chi2Bi = 1.04786     d = 0.000544895     a =
 20.1689     a1 = 0.893599     t1 =0.00044218     t2 = 0.646684
------------------------------------------------------------------------- D
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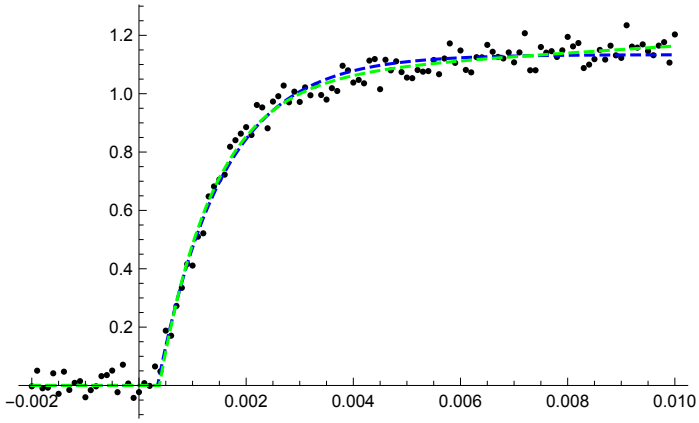
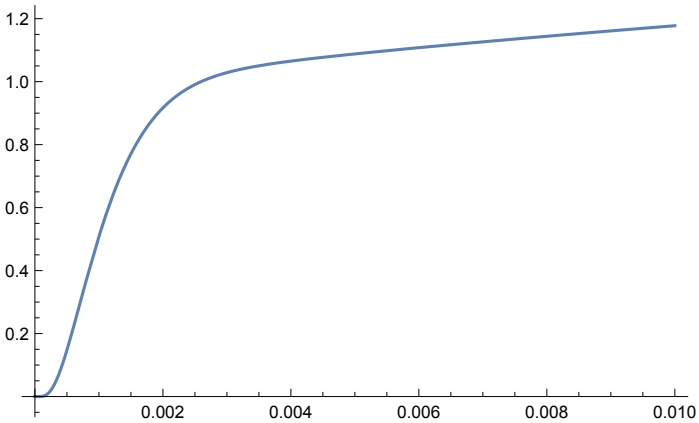
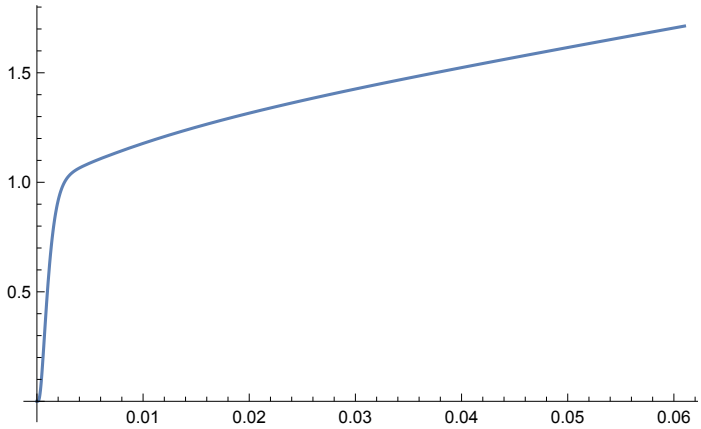



```
Mono: chi2 = 0.163967     d = 0.163967     a = 1.13368     t = 0.00120858
Bi: ratio chi2Mono/chi2Bi = 1.13593     d = 0.000380538     a =
 3.82855     a1 = 1.04914     t1 =0.00102381     t2 = 0.229326
-------------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 9.38444
  uM          -------------------------------------------------------
-------------------------------------------------------------------------------------
  --------------------------
```





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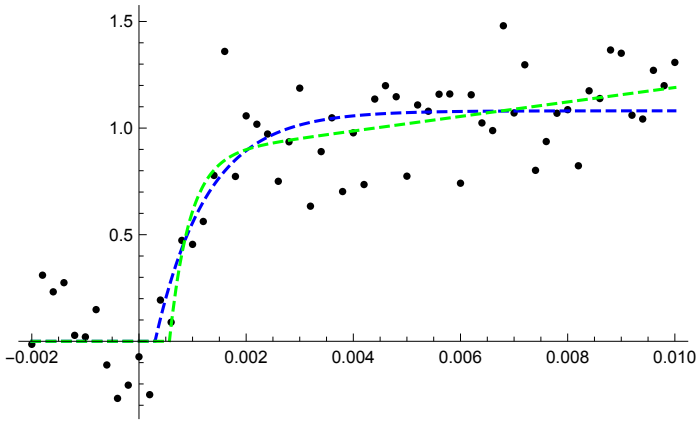


```
Mono: chi2 = 2.27046     d = 2.27046     a = 1.08095     t = 0.000968617
Bi: ratio chi2Mono/chi2Bi = 1.11525     d = 0.000567921     a =
 16.0874     a1 = 0.868484     t1 =0.000374336     t2 = 0.441365
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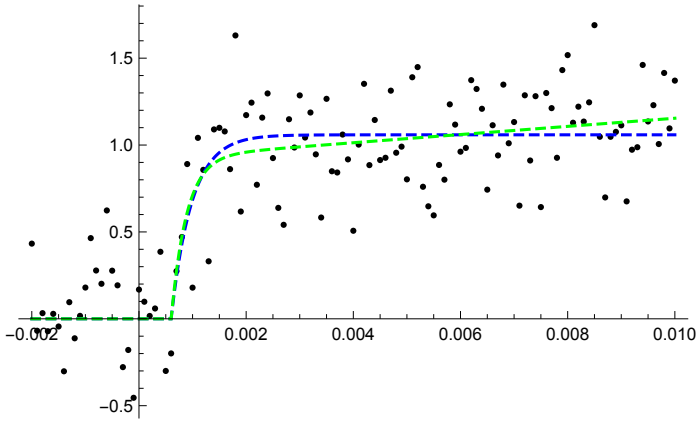


```
Mono: chi2 = 8.31395     d = 8.31395     a = 1.05886     t = 0.000384936
Bi: ratio chi2Mono/chi2Bi = 1.03321     d = 0.000601099     a =
 12.2367     a1 = 0.932741     t1 =0.000286384     t2 = 0.47502
------------------------------------------------------------------------ D
take bi
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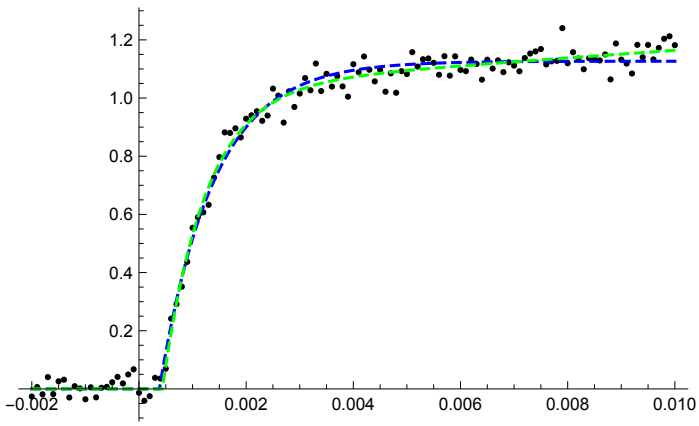
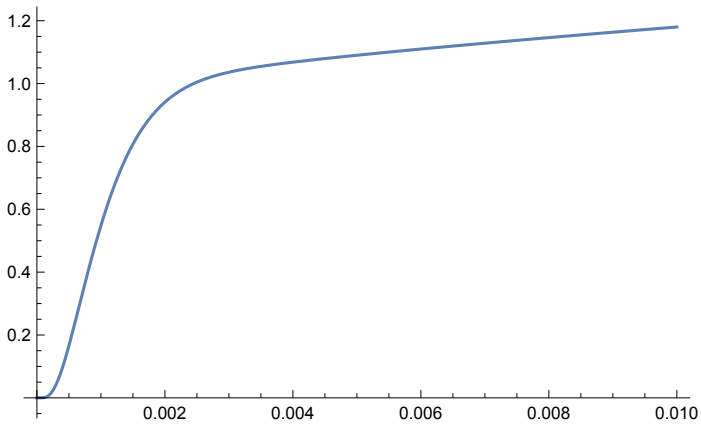
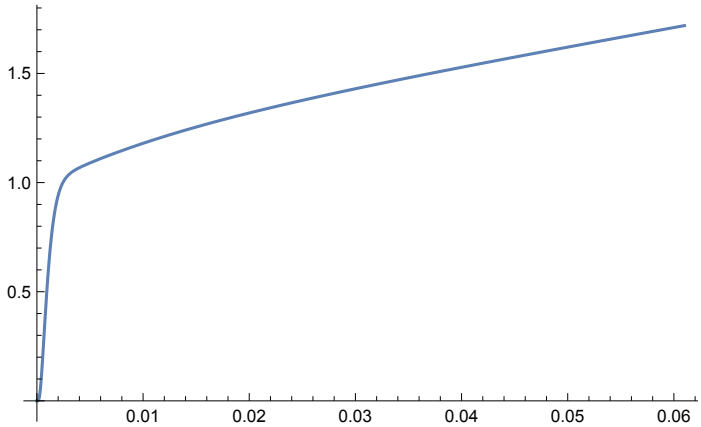


```
Mono: chi2 = 0.178072     d = 0.178072     a = 1.12662     t = 0.00100889
Bi: ratio chi2Mono/chi2Bi = 1.22436     d = 0.000435995     a =
 3.76606     a1 = 1.03629     t1 =0.000804761     t2 = 0.199464
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 9.82288
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
  -------------------------
```



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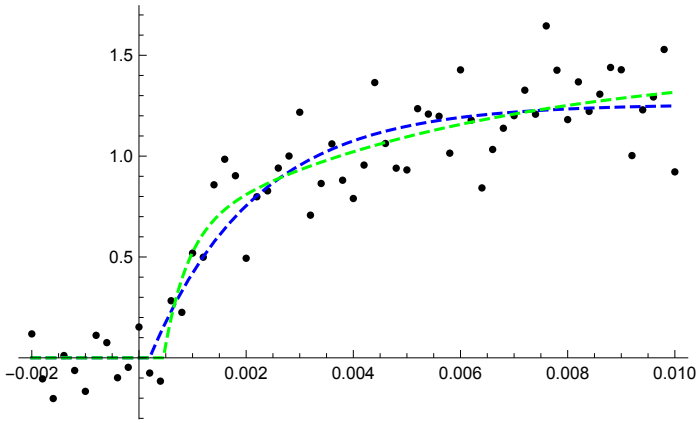


```
Mono: chi2 = 1.83568     d = 1.83568     a = 1.2576     t = 0.00196489

Bi: ratio chi2Mono/chi2Bi = 1.11222     d = 0.00045738     a =
 1.46488     a1 = 0.619251     t1 =0.000431602     t2 = 0.0054794

------------------------------------------------------------------------ C10

take mono

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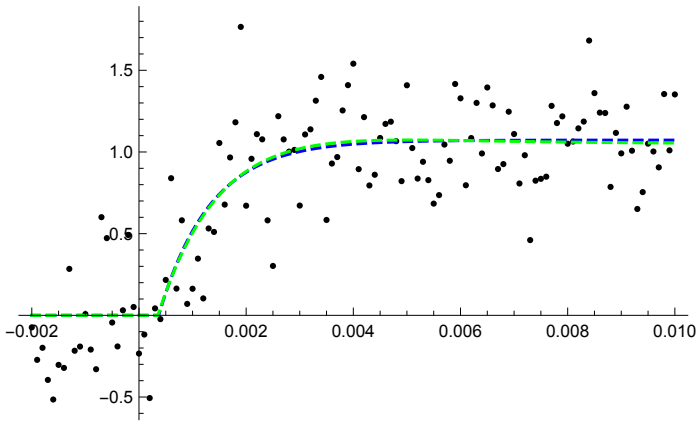


```
Mono: chi2 = 9.35773     d = 9.35773     a = 1.0725     t = 0.00096295
Bi: ratio chi2Mono/chi2Bi = 1.00275     d = 0.000355066     a =
 1.05135     a1 = 6.1681     t1 =0.00144021     t2 = 0.00157288
------------------------------------------------------------------------- D
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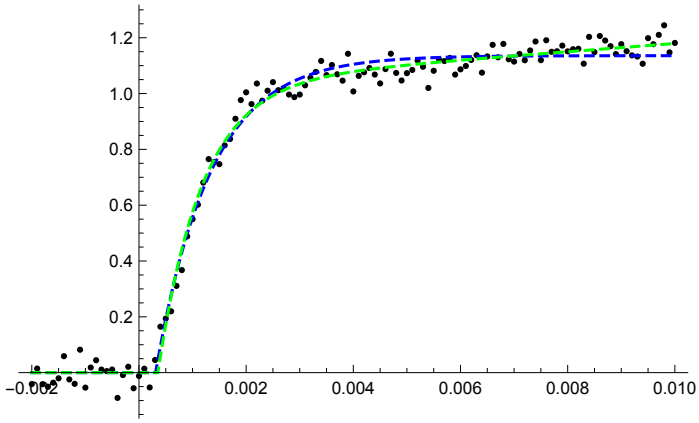


```
Mono: chi2 = 0.22256     d = 0.22256     a = 1.13578     t = 0.00102341
Bi: ratio chi2Mono/chi2Bi = 1.26202     d = 0.000353091     a =
 6.00594     a1 = 1.03565     t1 =0.000819134     t2 = 0.328878
------------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 10.2842
  uM         -------------------------------------------------------
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  -------------------------
```

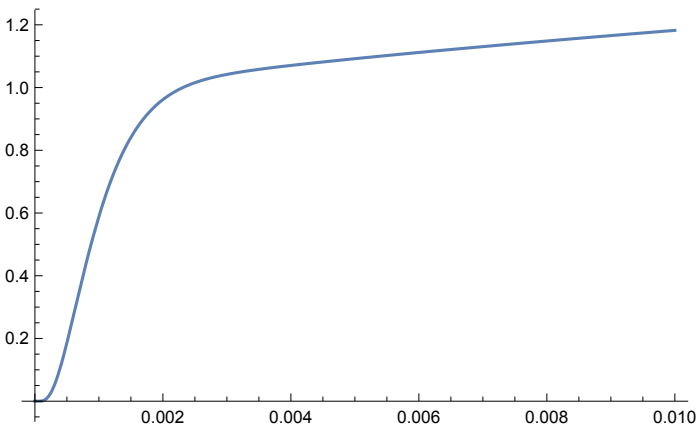

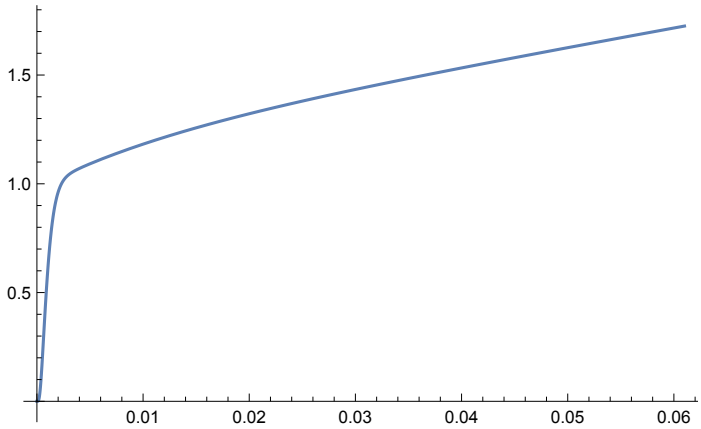

---------- C5

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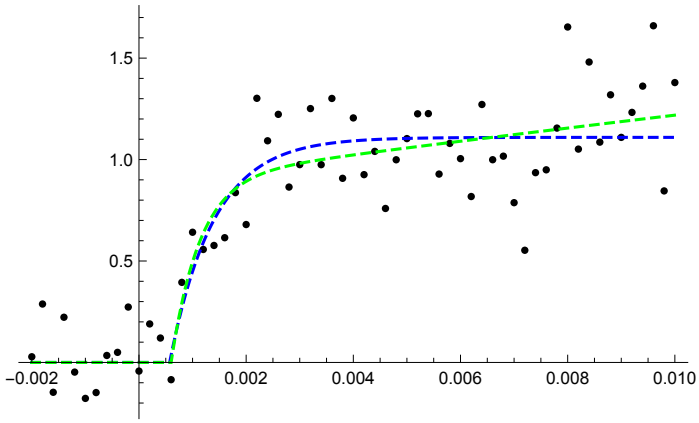


```
Mono: chi2 = 2.69976     d = 2.69976     a = 1.10939     t = 0.000824014
Bi: ratio chi2Mono/chi2Bi = 1.05583     d = 0.0006     a =
 4.58236     a1 = 0.90899     t1 =0.000529211     t2 = 0.106677
------------------------------------------------------------------------ C10
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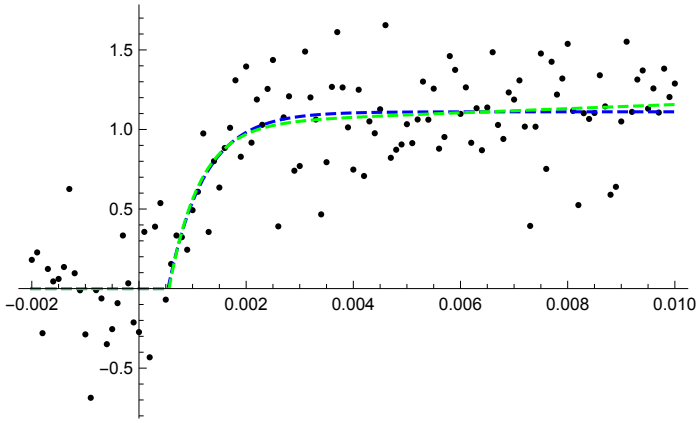


```
Mono: chi2 = 8.92825     d = 8.92825     a = 1.11105     t = 0.000678032
Bi: ratio chi2Mono/chi2Bi = 1.00629     d = 0.000560786     a =
 6.29952     a1 = 1.03377     t1 =0.000570431     t2 = 0.399181
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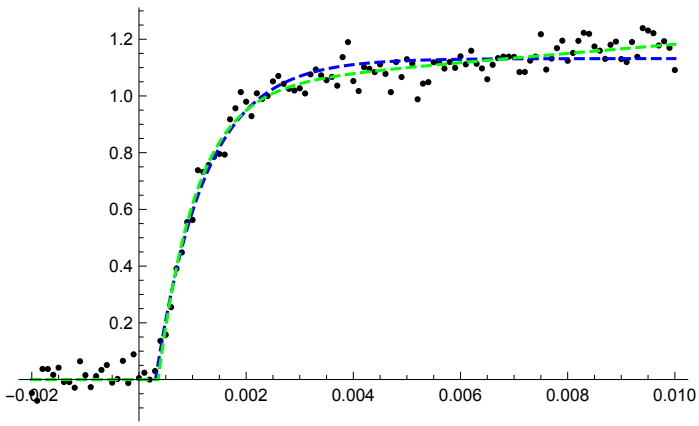
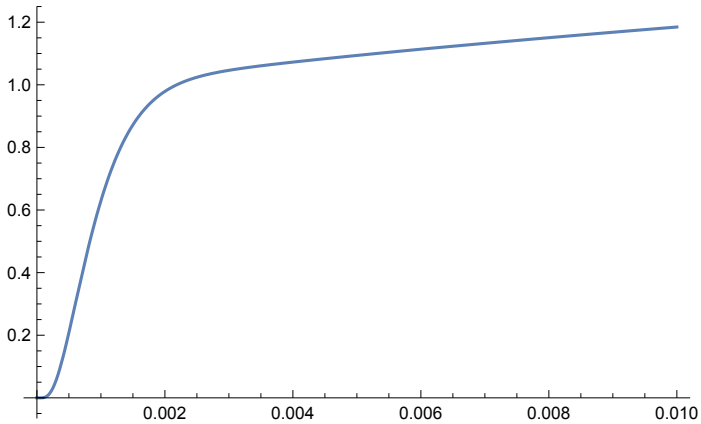
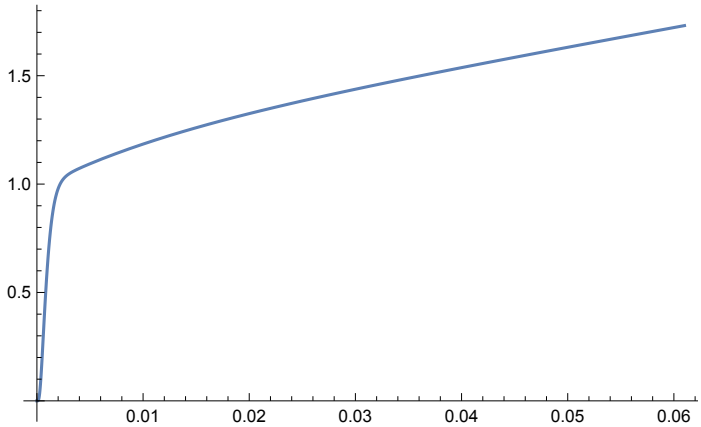


```
Mono: chi2 = 0.261867     d = 0.261867     a = 1.13171     t = 0.000928031
Bi: ratio chi2Mono/chi2Bi = 1.32412     d = 0.000357313     a =
 5.90381     a1 = 1.02496     t1 =0.000716061     t2 = 0.294363
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 10.77
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
  -------------------------
```



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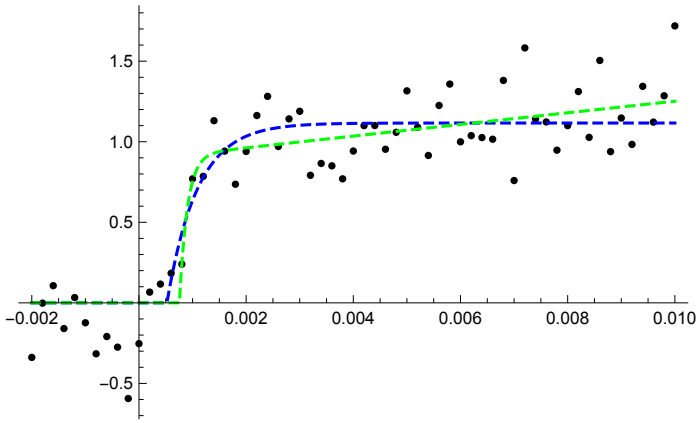


```
Mono: chi2 = 2.82458     d = 2.82458     a = 1.11611     t = 0.000566555

Bi: ratio chi2Mono/chi2Bi = 1.12305     d = 0.000755584     a =
 18.8253     a1 = 0.916861     t1 =0.000147055     t2 = 0.490048

------------------------------------------------------------------------ C10

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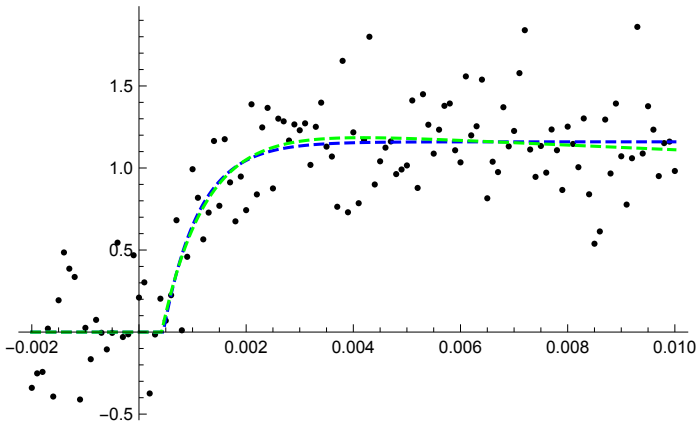


```
Mono: chi2 = 8.1312     d = 8.1312     a = 1.15947     t = 0.000665964
Bi: ratio chi2Mono/chi2Bi = 1.00671     d = 0.000422516     a =
 0.215567     a1 = 1.25705     t1 =0.000814303     t2 = 0.0634567
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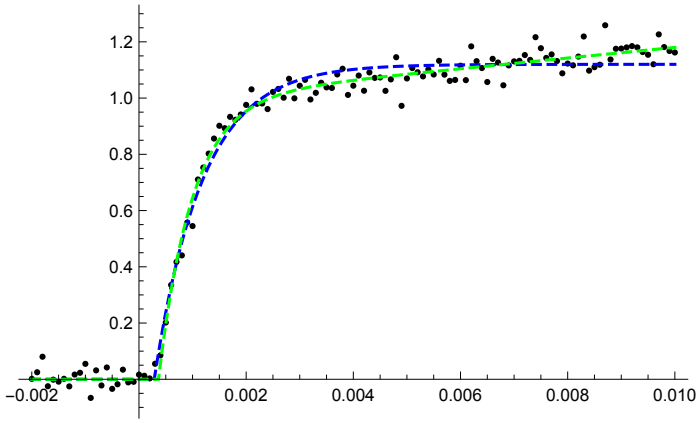
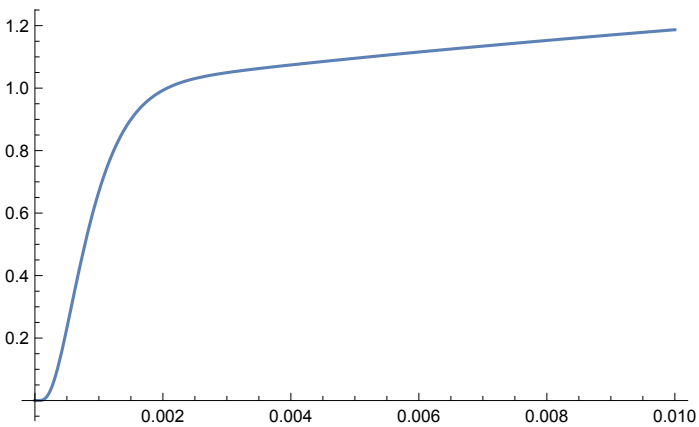
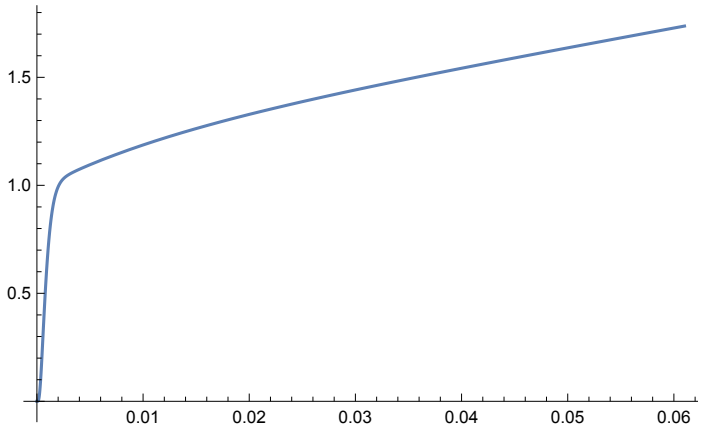



```
Mono: chi2 = 0.252739     d = 0.252739     a = 1.12001     t = 0.000900922
Bi: ratio chi2Mono/chi2Bi = 1.62796     d = 0.000364286     a =
 7.13198     a1 = 0.996028     t1 =0.000630221     t2 = 0.316161
------------------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 11.2815
  uM         -------------------------------------------------------
------------------------------------------------------------------------------------------
  --------------------------
```





---------- C5

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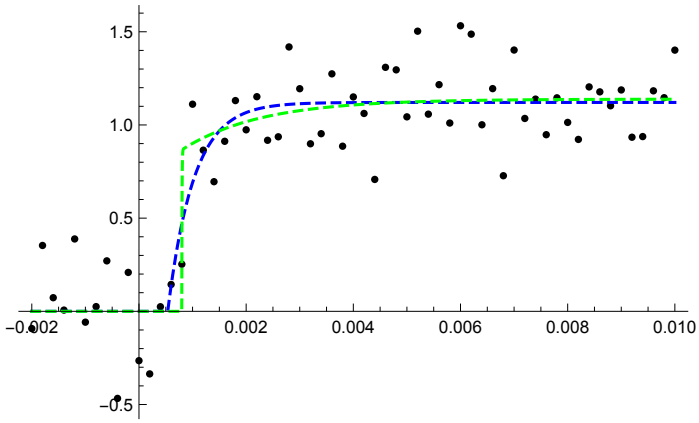

Mono: chi2 = 2.66825 d = 2.66825 a = 1.12084 t = 0.000483835

Bi: ratio chi2Mono/chi2Bi = 1.06057 d = 0.000798395 a = 1.13854 a1 = 0.866272 t1 = 4.65874×10^{-6} t2 = 0.00147945

---------- C10

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take mono
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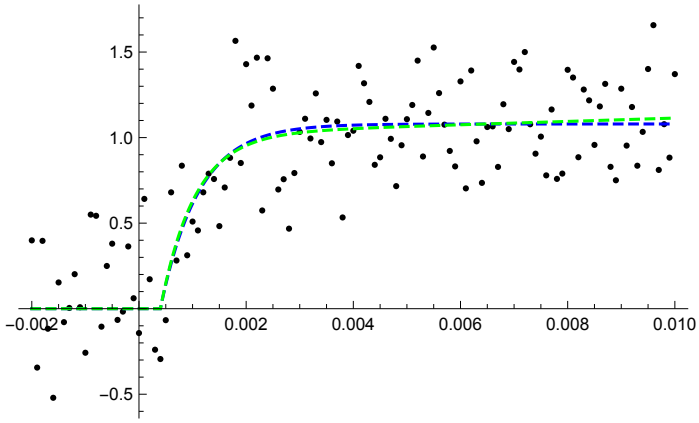


```
Mono: chi2 = 8.87448     d = 8.87448     a = 1.07959     t = 0.000712684
Bi: ratio chi2Mono/chi2Bi = 1.00343     d = 0.000400712     a =
 4.08341     a1 = 1.01962     t1 =0.000634999     t2 = 0.306502
------------------------------------------------------------------------ D
take bi
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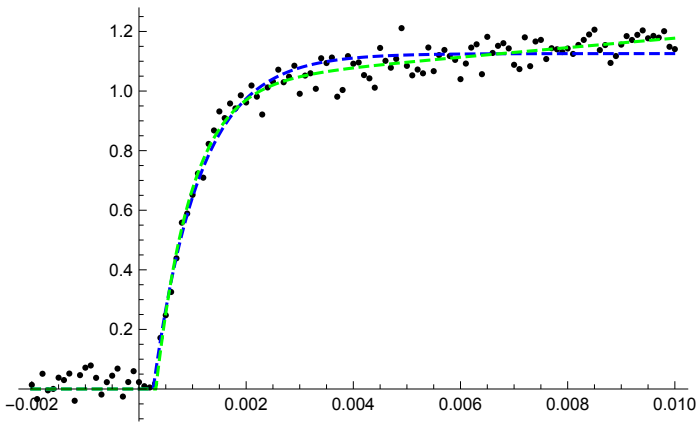
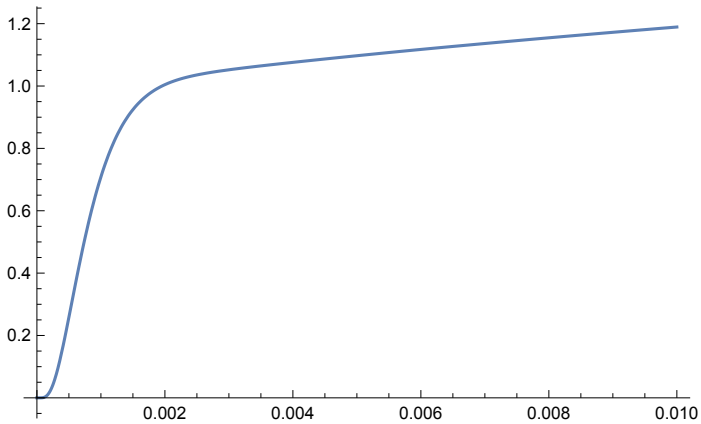
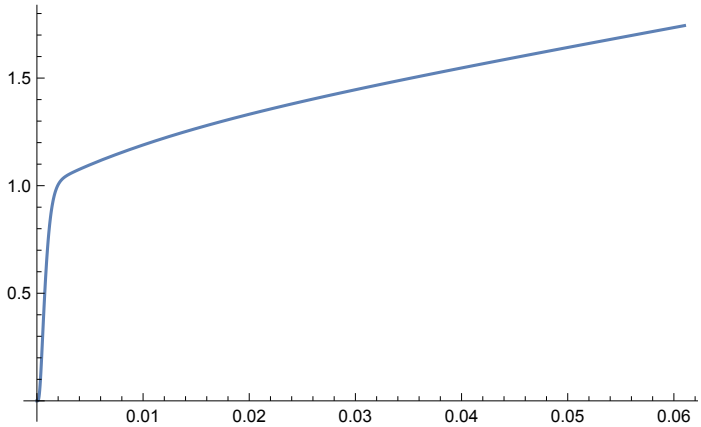


```
Mono: chi2 = 0.242891     d = 0.242891     a = 1.12572     t = 0.000864798
Bi: ratio chi2Mono/chi2Bi = 1.38352     d = 0.000314647     a =
 4.78784     a1 = 1.02092     t1 =0.000657383     t2 = 0.228152
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 11.8202
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
  -------------------------
```



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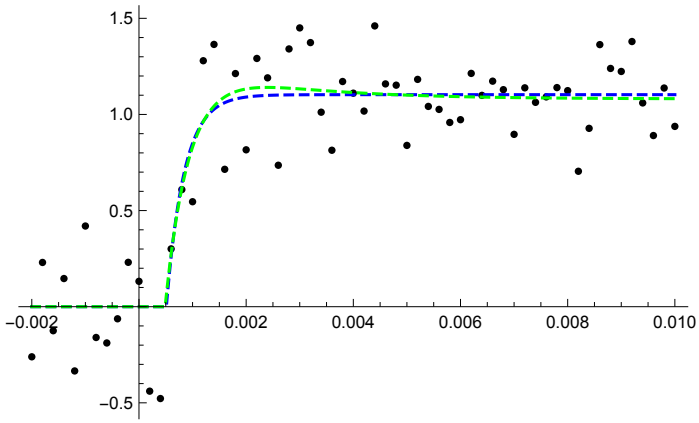


```
Mono: chi2 = 2.8238     d = 2.8238     a = 1.10287     t = 0.000332344

Bi: ratio chi2Mono/chi2Bi = 1.00772     d = 0.000488224     a =
 1.08064     a1 = 1.29399     t1 =0.000448869     t2 = 0.00190547

------------------------------------------------------------------------ C10

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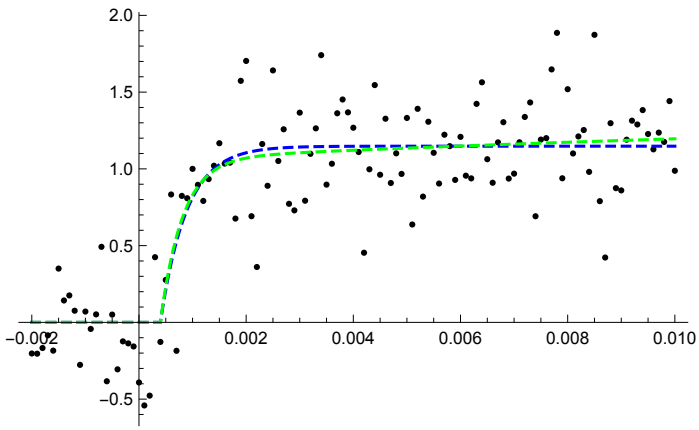


```
Mono: chi2 = 10.4965     d = 10.4965     a = 1.14783     t = 0.000487863
Bi: ratio chi2Mono/chi2Bi = 1.00625     d = 0.0004     a =
 1.42262     a1 = 1.06575     t1 =0.000410255     t2 = 0.0211727
------------------------------------------------------------------------- D
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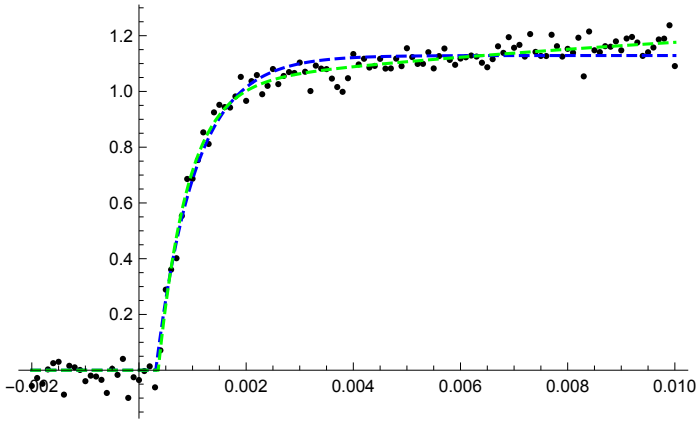
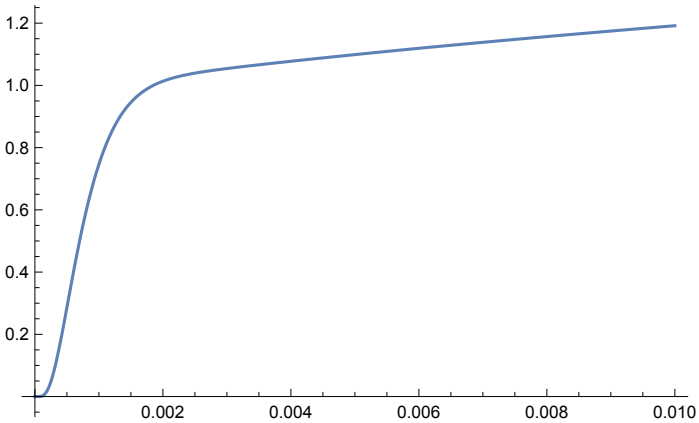
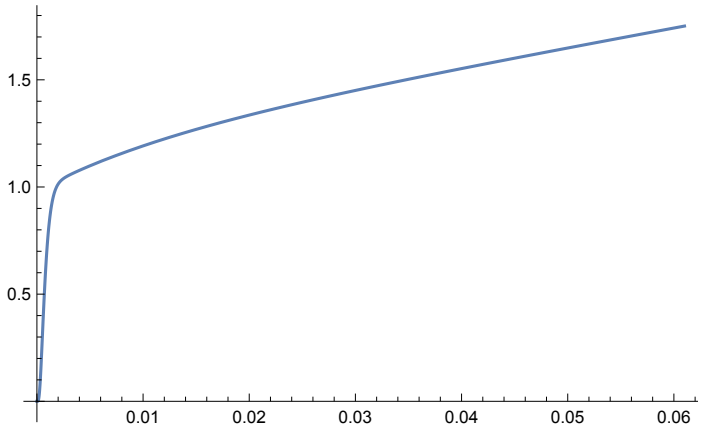



```
Mono: chi2 = 0.225417     d = 0.225417     a = 1.1288     t = 0.000735922
Bi: ratio chi2Mono/chi2Bi = 1.4558     d = 0.000359385     a =
 1.34212     a1 = 1.0169     t1 =0.000547246     t2 = 0.0143322
------------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 12.3876
  uM         -------------------------------------------------------
------------------------------------------------------------------------------------------
  -------------------------
```





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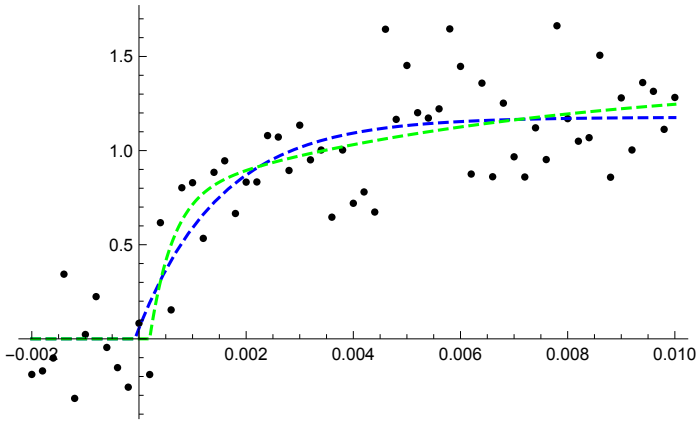


```
Mono: chi2 = 3.38323     d = 3.38323     a = 1.17707     t = 0.00154275
Bi: ratio chi2Mono/chi2Bi = 1.04189     d = 0.0002     a =
 1.39116     a1 = 0.752408     t1 =0.000419012     t2 = 0.00661374
------------------------------------------------------------------------ C10
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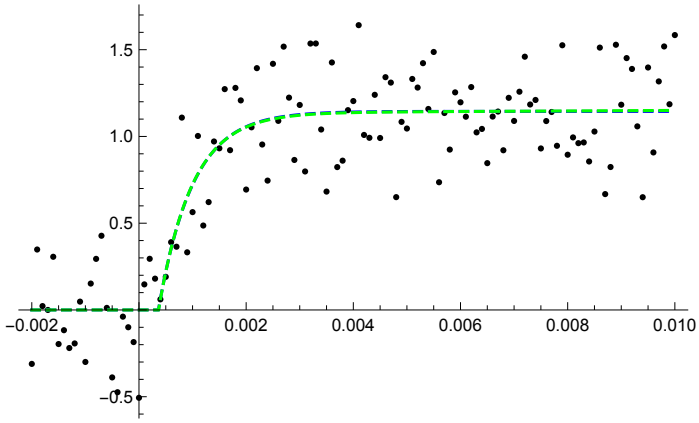


```
Mono: chi2 = 7.56649     d = 7.56649     a = 1.14449     t = 0.000639289
Bi: ratio chi2Mono/chi2Bi = 1.00011     d = 0.000365596     a =
 2.81591     a1 = 1.13509     t1 =0.000626506     t2 = 1.07936
------------------------------------------------------------------------ D
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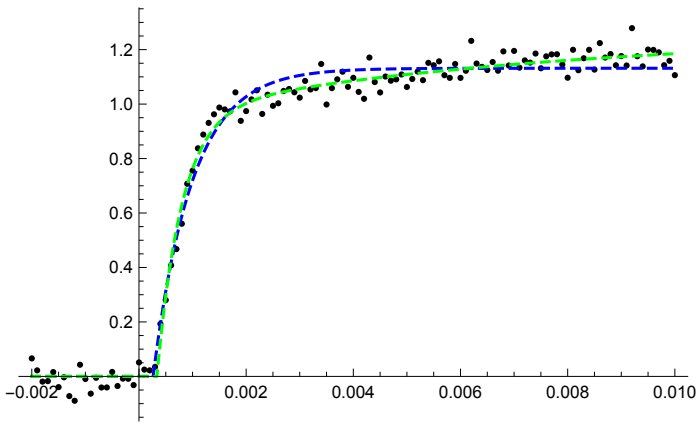

```
Mono: chi2 = 0.291423     d = 0.291423     a = 1.1316     t = 0.000728203
Bi: ratio chi2Mono/chi2Bi = 1.64756     d = 0.000334511     a =
 1.26126     a1 = 0.969624     t1 =0.000467125     t2 = 0.00719895
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 12.9855
  uM         -------------------------------------------------------
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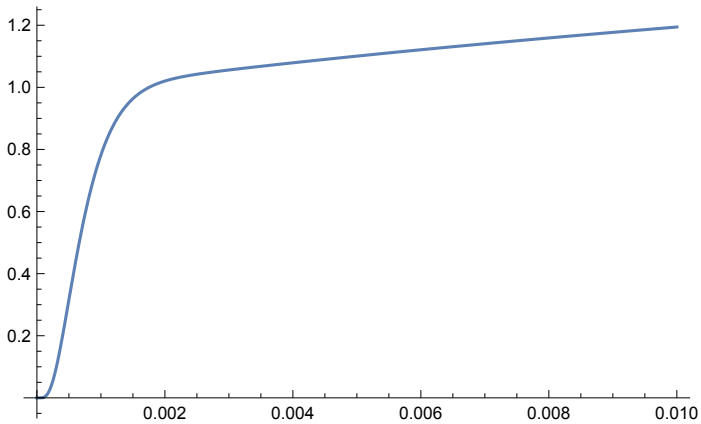
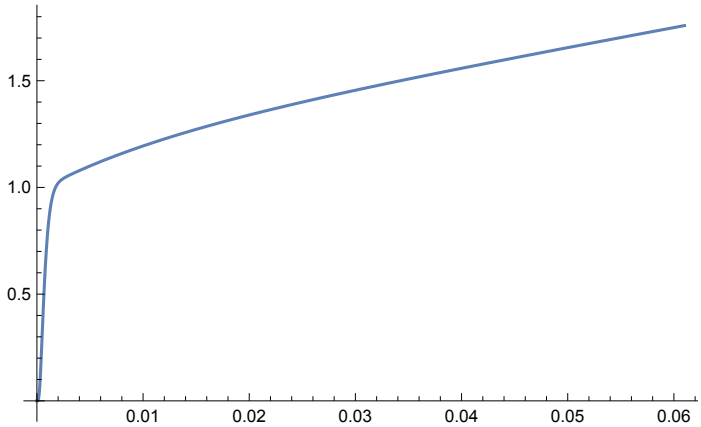
```



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------------------------------------------------------------------------------ C5
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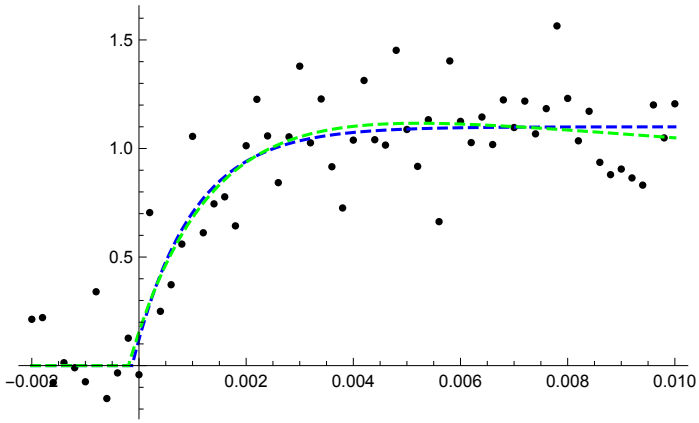


```
Mono: chi2 = 2.21963     d = 2.21963     a = 1.09975     t = 0.00110153
Bi: ratio chi2Mono/chi2Bi = 1.01183     d = -0.000195836
      a = 0.183523     a1 = 1.2705     t1 =0.00146071     t2 = 0.04504
------------------------------------------------------------------------ C10
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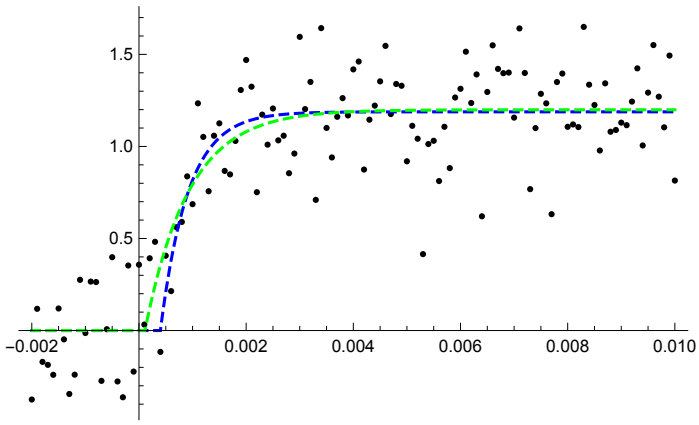


```
Mono: chi2 = 7.34878     d = 7.34878     a = 1.18795     t = 0.000516025
Bi: ratio chi2Mono/chi2Bi = 0.998997     d = 0.000112705     a =
 1.19921     a1 = 1.1479     t1 =0.000818617     t2 = 0.000818617
------------------------------------------------------------------------- D
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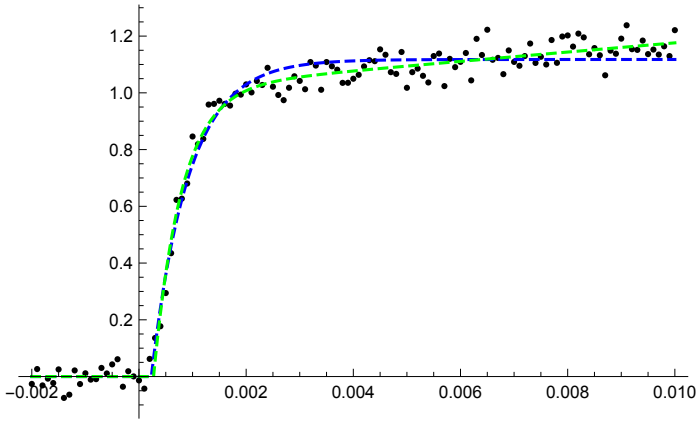
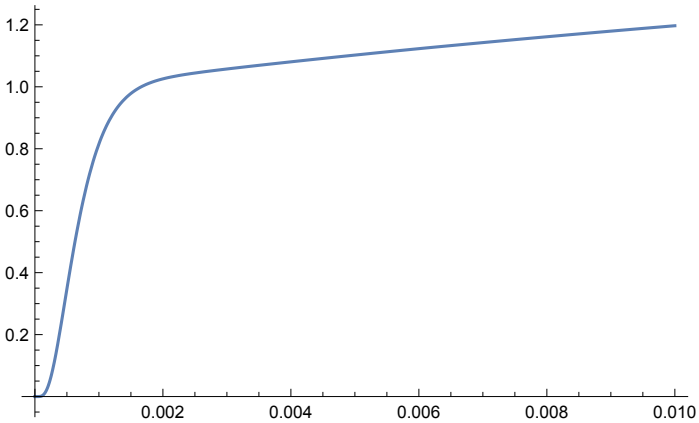
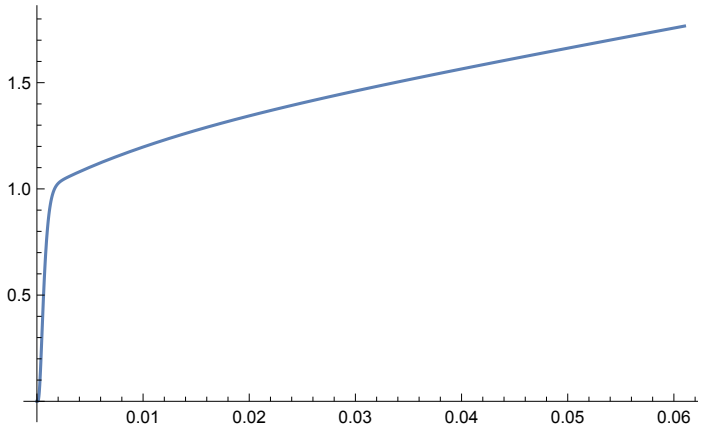



```
Mono: chi2 = 0.291262     d = 0.291262     a = 1.11756     t = 0.000696556
Bi: ratio chi2Mono/chi2Bi = 1.48376     d = 0.000272467     a =
 3.58666     a1 = 1.01441     t1 =0.000519228     t2 = 0.149766
------------------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 13.6155
  uM         -------------------------------------------------------
------------------------------------------------------------------------------------------
  --------------------------
```





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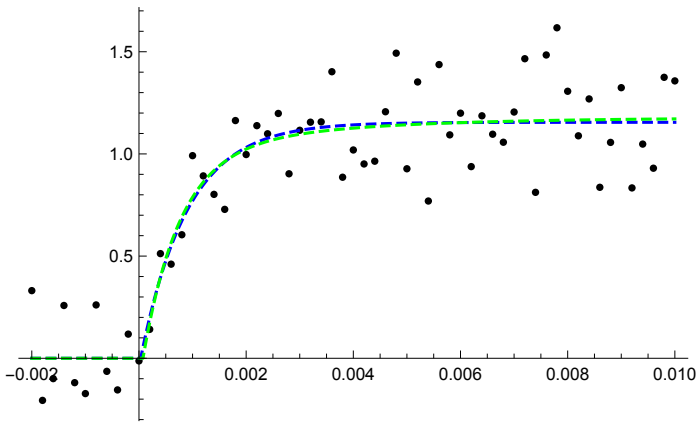


```
Mono: chi2 = 2.31828     d = 2.31828     a = 1.15471     t = 0.000878808
Bi: ratio chi2Mono/chi2Bi = 1.00368     d = 0.0000749031     a =
 1.17765     a1 = 0.992681     t1 =0.000679718     t2 = 0.00292834
------------------------------------------------------------------------ C10
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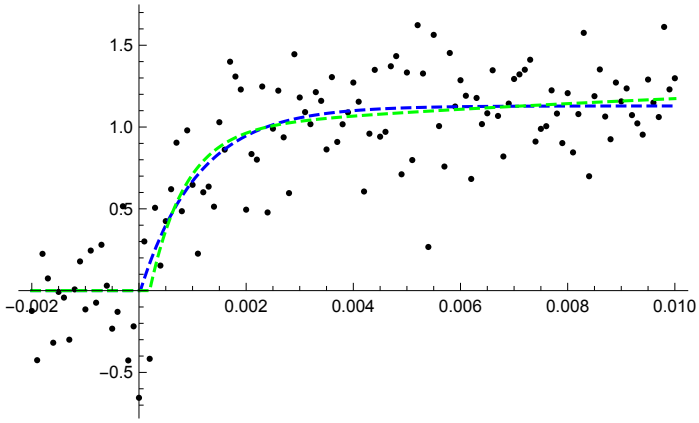


```
Mono: chi2 = 8.56414     d = 8.56414     a = 1.12901     t = 0.00108385
Bi: ratio chi2Mono/chi2Bi = 1.00889     d = 0.0002     a =
 1.42603     a1 = 0.98288     t1 =0.000658759     t2 = 0.0173871
------------------------------------------------------------------------ D
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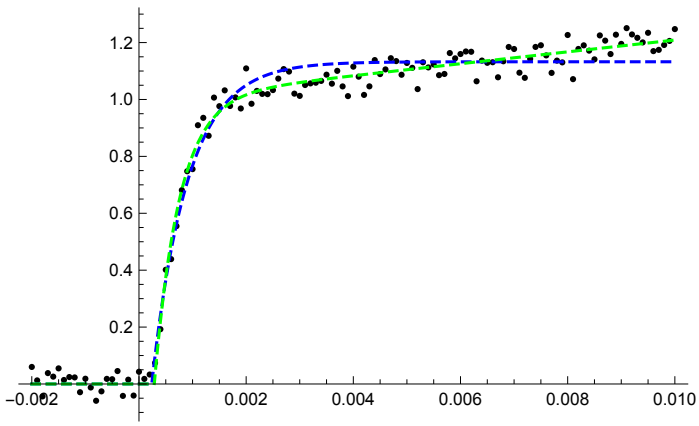
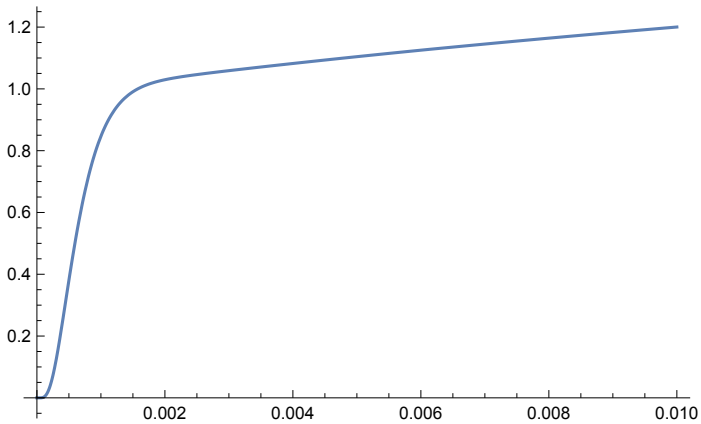
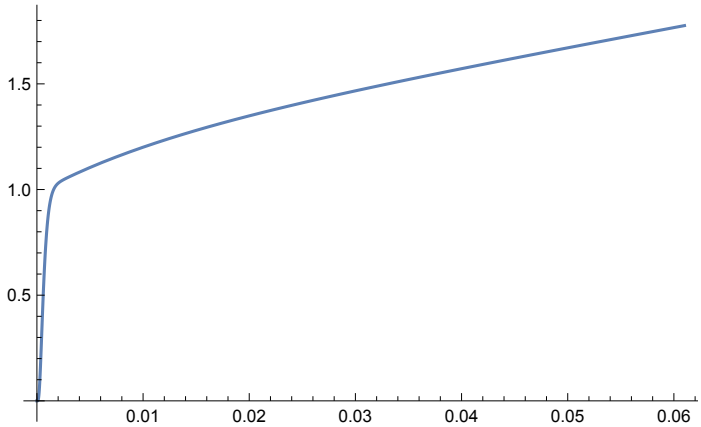


```
Mono: chi2 = 0.337135     d = 0.337135     a = 1.13252     t = 0.000672812
Bi: ratio chi2Mono/chi2Bi = 1.95982     d = 0.000286036     a =
 7.76588     a1 = 1.00489     t1 =0.000464908     t2 = 0.317079
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 14.2795
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
  -------------------------
```



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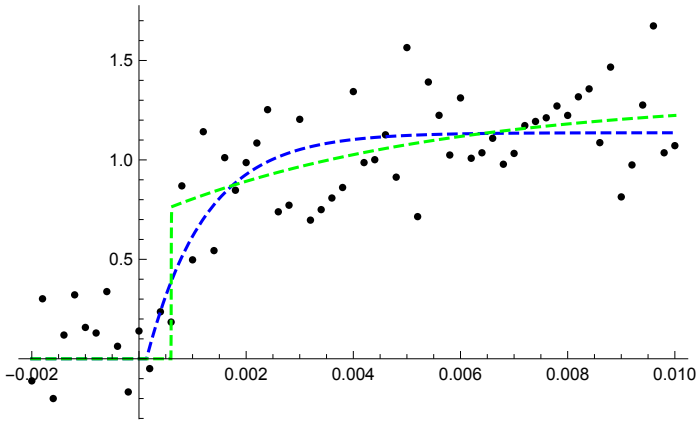

Mono: chi2 = 2.93153 d = 2.93153 a = 1.13657 t = 0.00109978

Bi: ratio chi2Mono/chi2Bi = 1.10148 d = 0.000599226 a = 1.3165 a1 = 0.763193 t1 = 2.8018×10^{-6} t2 = 0.00526796

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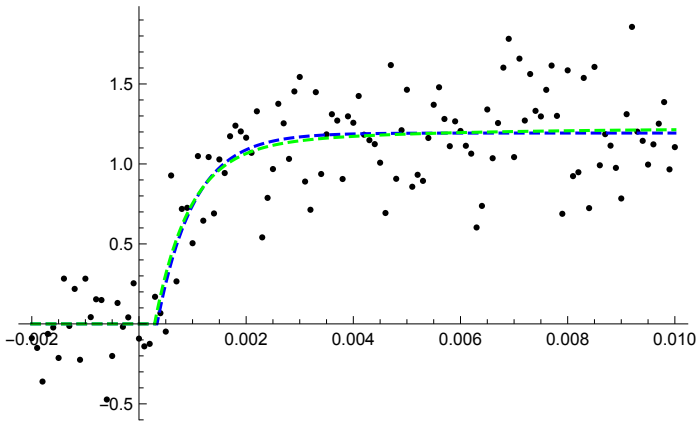


```
Mono: chi2 = 7.92786     d = 7.92786     a = 1.19309     t = 0.000683369
Bi: ratio chi2Mono/chi2Bi = 1.00195     d = 0.0002914     a =
 1.22246     a1 = 1.0882     t1 =0.000639426     t2 = 0.00351643
------------------------------------------------------------------------- D
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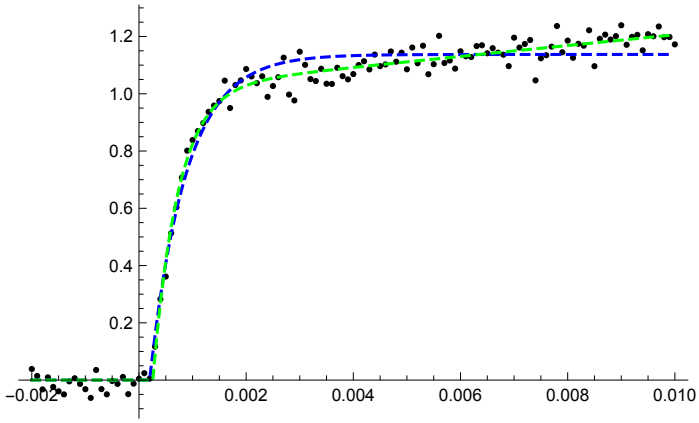
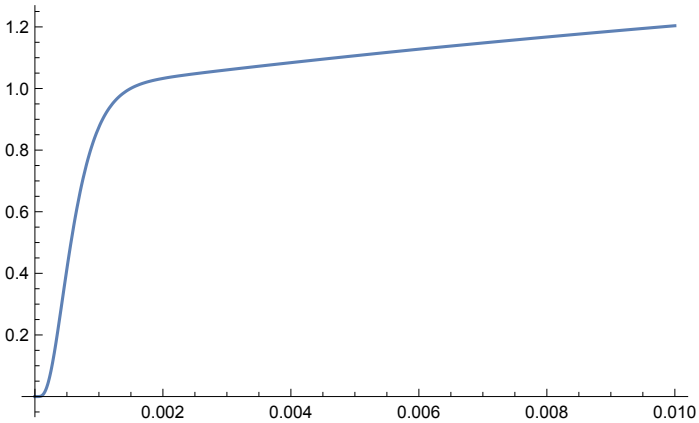
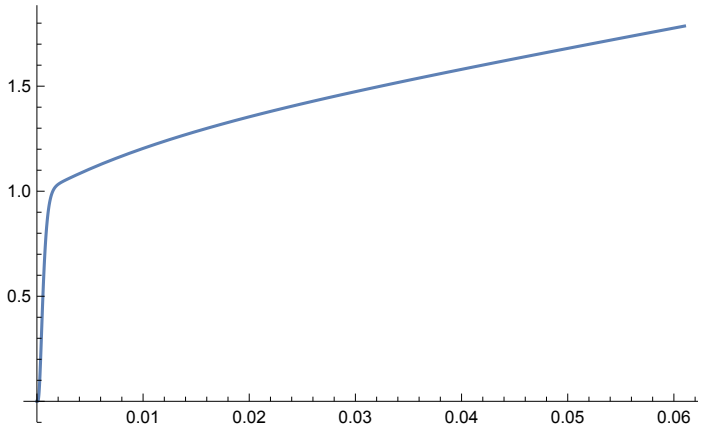



```
Mono: chi2 = 0.279894     d = 0.279894     a = 1.13732     t = 0.00067829
Bi: ratio chi2Mono/chi2Bi = 1.91936     d = 0.000258449     a =
 4.19979     a1 = 1.01894     t1 =0.000468576     t2 = 0.160768
------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 14.9795
  uM         -------------------------------------------------------
------------------------------------------------------------------------------------
  -------------------------
```





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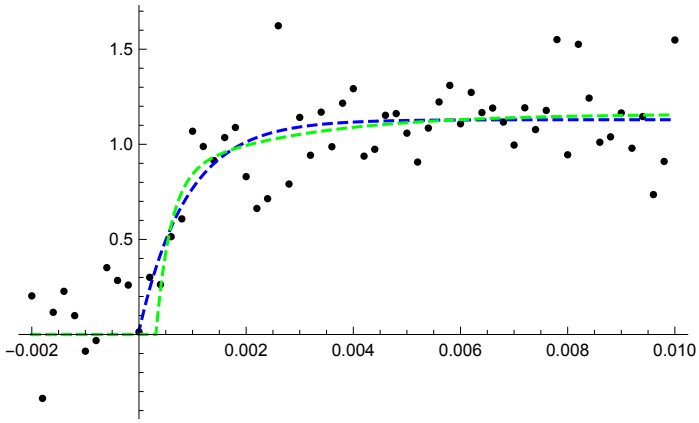


```
Mono: chi2 = 2.45677     d = 2.45677     a = 1.12924     t = 0.000888849
Bi: ratio chi2Mono/chi2Bi = 1.00189     d = 0.000315821     a =
 1.16035     a1 = 0.826613     t1 =0.000271868     t2 = 0.00238249
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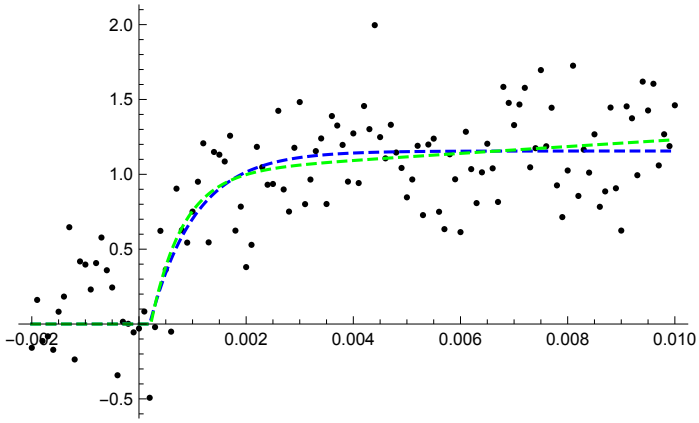


```
Mono: chi2 = 10.2964     d = 10.2964     a = 1.1557     t = 0.000854684
Bi: ratio chi2Mono/chi2Bi = 1.01458     d = 0.000220908     a =
 8.8191     a1 = 1.00629     t1 =0.000591445     t2 = 0.335134
------------------------------------------------------------------------ D
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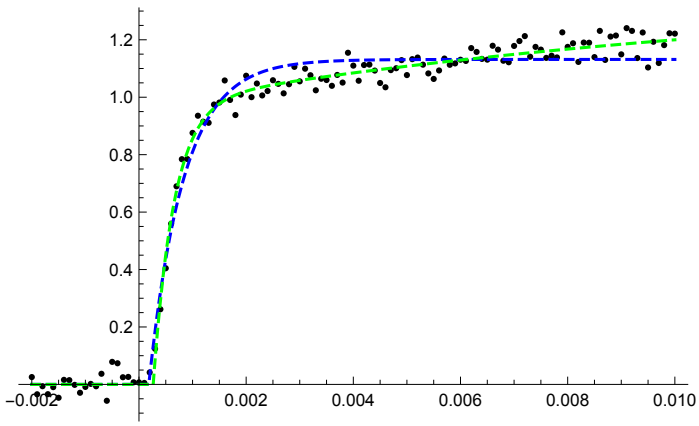

```
Mono: chi2 = 0.309443     d = 0.309443     a = 1.13155     t = 0.000648974
Bi: ratio chi2Mono/chi2Bi = 2.25213     d = 0.000265674     a =
 1.38499     a1 = 0.978965     t1 =0.000387916     t2 = 0.0123878
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 15.7174
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
  -------------------------
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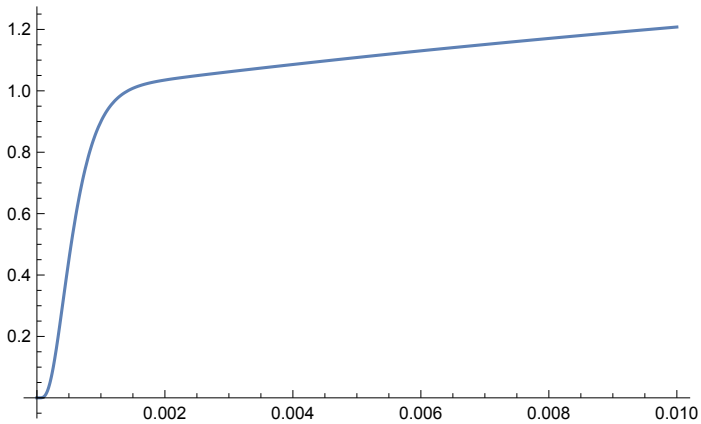

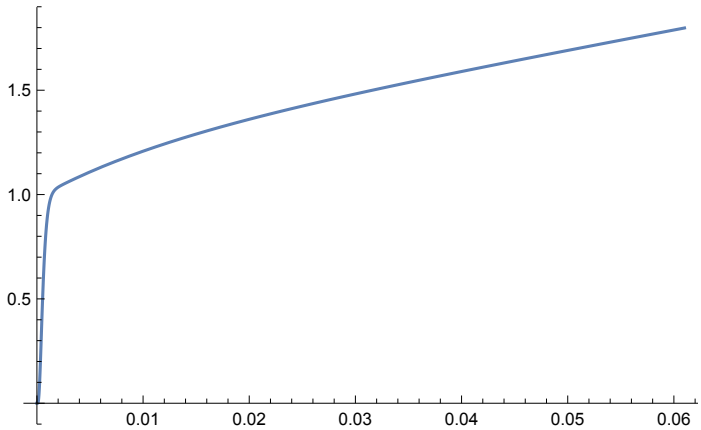


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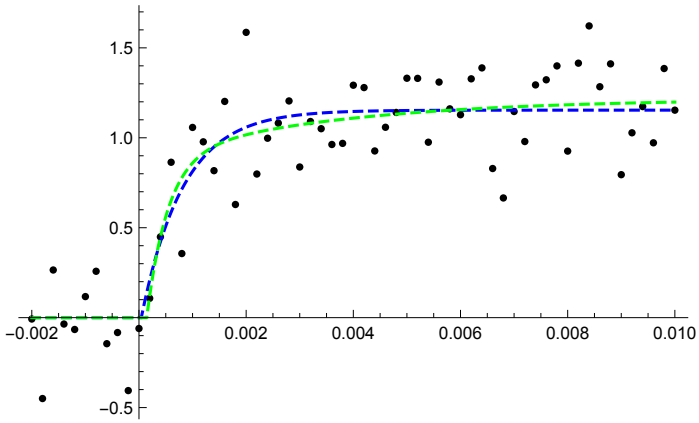


```
Mono: chi2 = 3.03033     d = 3.03033     a = 1.15366     t = 0.000783673

Bi: ratio chi2Mono/chi2Bi = 1.02468     d = 0.000144806     a =
 1.21731     a1 = 0.886555     t1 =0.000391045     t2 = 0.00344553

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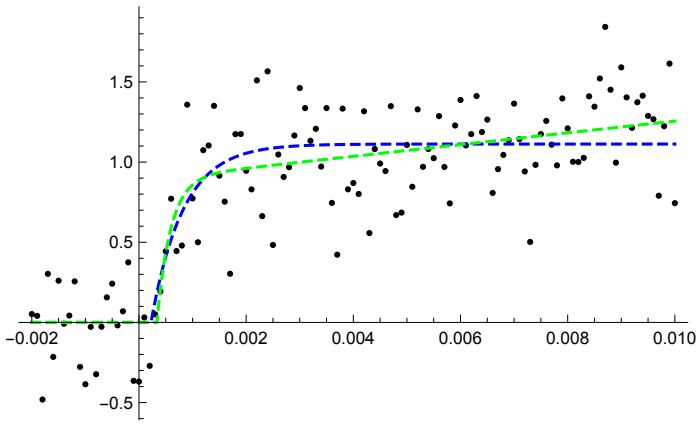


```
Mono: chi2 = 9.28279     d = 9.28279     a = 1.11243     t = 0.000599273
Bi: ratio chi2Mono/chi2Bi = 1.07332     d = 0.000334569     a =
 26.9097     a1 = 0.900573     t1 =0.000256862     t2 = 0.703295
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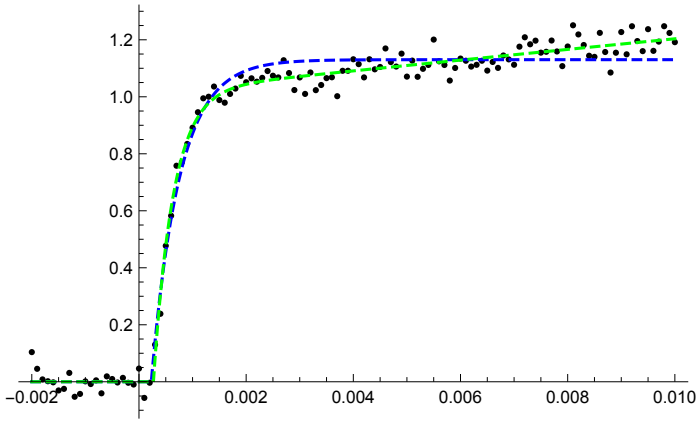


```
Mono: chi2 = 0.310695     d = 0.310695     a = 1.13018     t = 0.000523358
Bi: ratio chi2Mono/chi2Bi = 2.03119     d = 0.00026986     a =
 7.11467     a1 = 1.01974     t1 =0.000367928     t2 = 0.317769
------------------------------------------------------------------------------------
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----------------     Ca = 16.4957
  uM         -------------------------------------------------------
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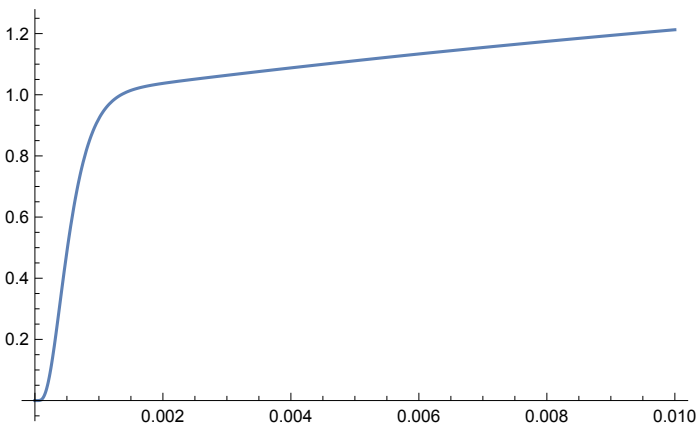

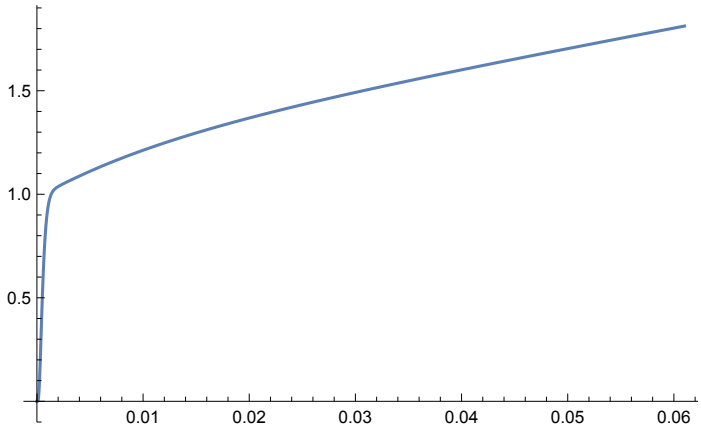

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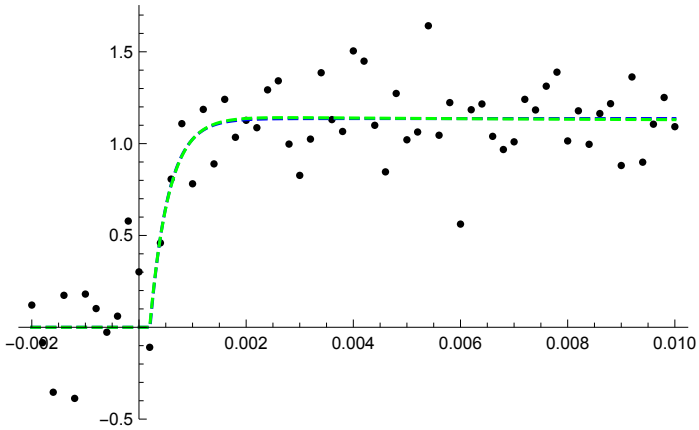


```
Mono: chi2 = 2.60918     d = 2.60918     a = 1.13647     t = 0.000343768
Bi: ratio chi2Mono/chi2Bi = 1.00043     d = 0.0002     a =
 1.12187     a1 = 1.14988     t1 =0.000359188     t2 = 0.00828051
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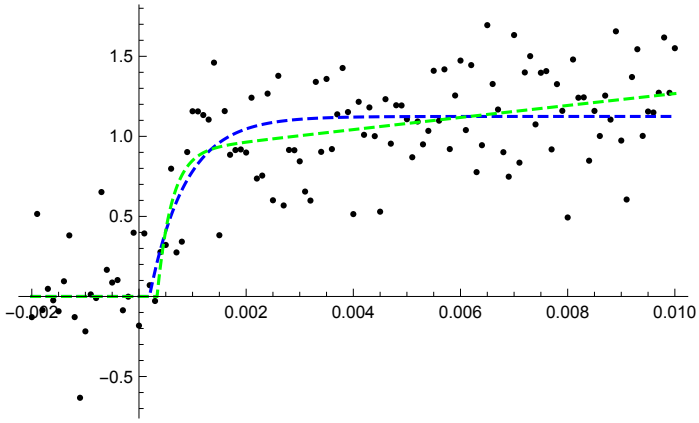


```
Mono: chi2 = 9.78929     d = 9.78929     a = 1.12442     t = 0.000676473
Bi: ratio chi2Mono/chi2Bi = 1.08199     d = 0.000337585     a =
 7.845     a1 = 0.901294     t1 =0.000270479     t2 = 0.178532
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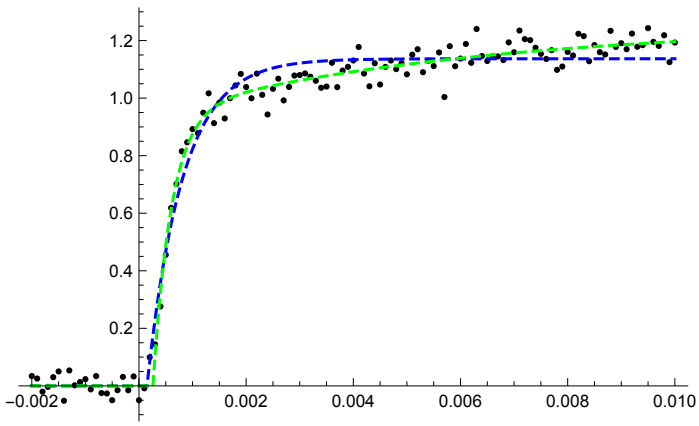

```
Mono: chi2 = 0.351359     d = 0.351359     a = 1.13676     t = 0.000659934
Bi: ratio chi2Mono/chi2Bi = 1.94007     d = 0.000260907     a =
 1.25587     a1 = 0.948221     t1 =0.000342727     t2 = 0.00593875
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----------------     Ca = 17.3163
  uM         -------------------------------------------------------
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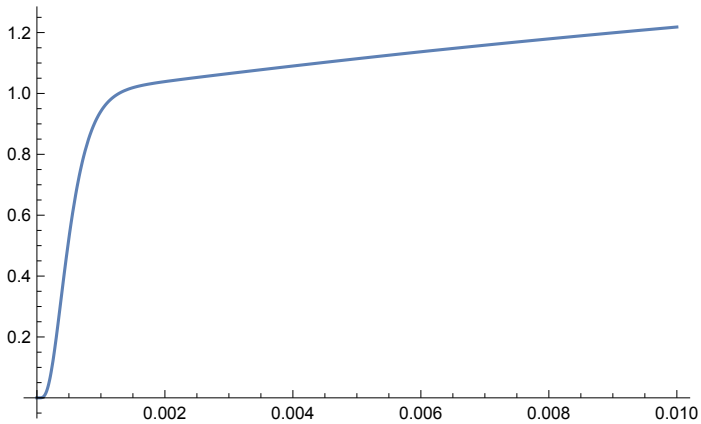

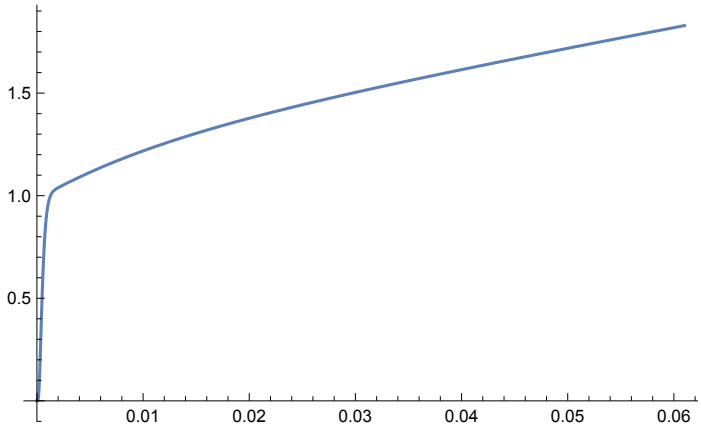


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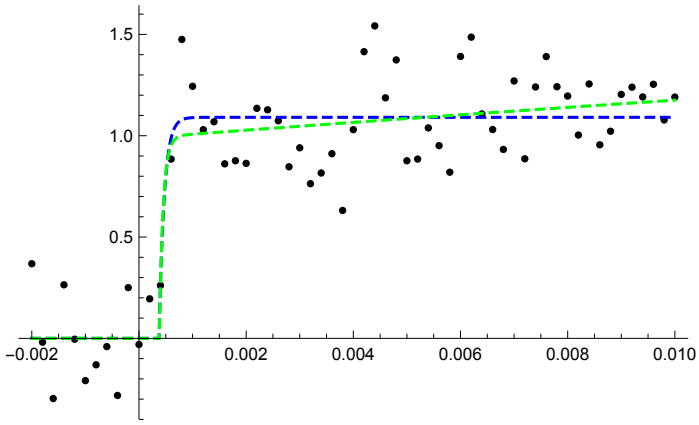


```
Mono: chi2 = 2.61731     d = 2.61731     a = 1.09072     t = 0.0000952763
Bi: ratio chi2Mono/chi2Bi = 1.0493     d = 0.000377844     a =
 2.58431     a1 = 0.995395     t1 =0.0000736579     t2 = 0.0800224
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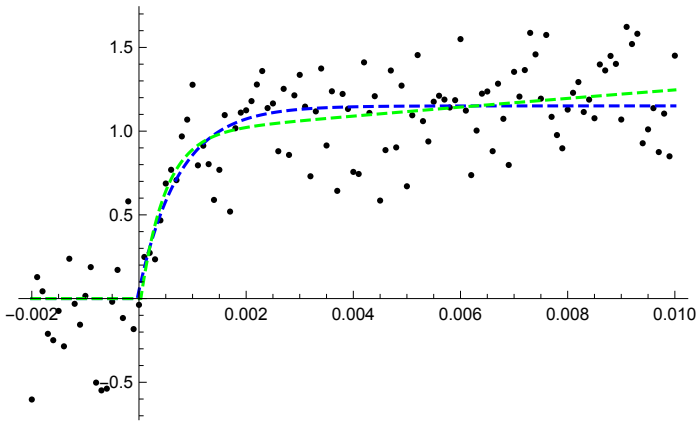


```
Mono: chi2 = 7.35041     d = 7.35041     a = 1.15082     t = 0.000755294
Bi: ratio chi2Mono/chi2Bi = 1.03866     d = 0.0000348968     a =
 2.98075     a1 = 0.97885     t1 =0.00045362     t2 = 0.0694933
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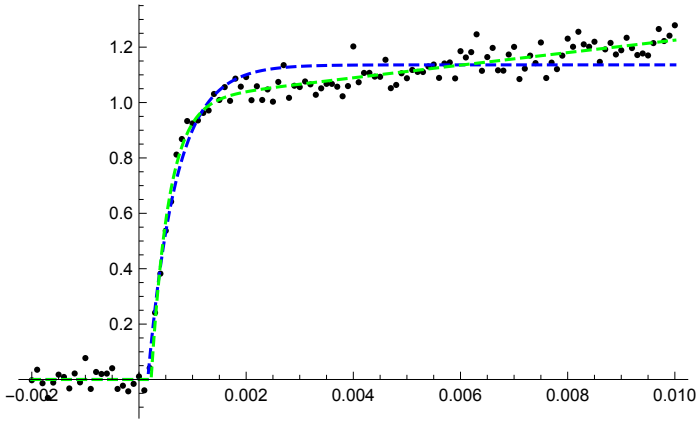


```
Mono: chi2 = 0.397694     d = 0.397694     a = 1.13603     t = 0.0005305
Bi: ratio chi2Mono/chi2Bi = 2.45449     d = 0.000226567     a =
 6.69759     a1 = 1.00217     t1 =0.000328747     t2 = 0.244558
-------------------------------------------------------------------------------------
  --------------------------
----------------     Ca = 18.1821
  uM         -------------------------------------------------------
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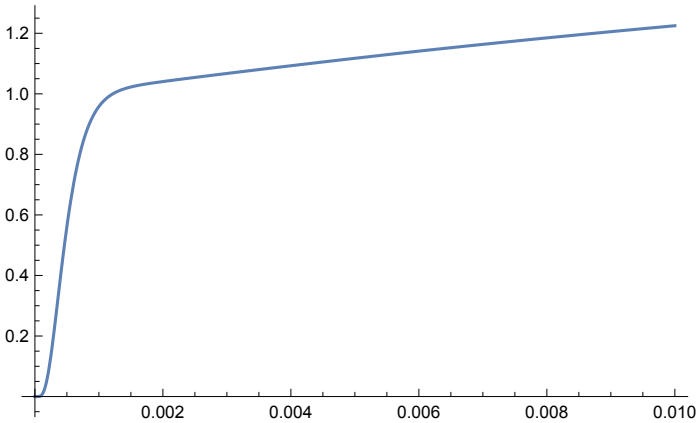

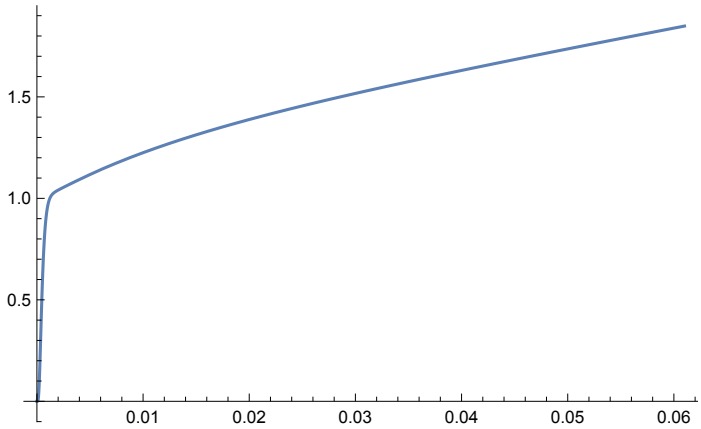

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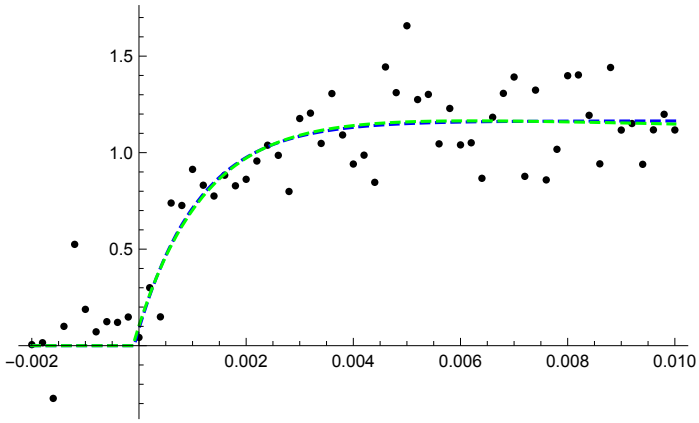


```
Mono: chi2 = 2.06774     d = 2.06774     a = 1.16431     t = 0.00114994
Bi: ratio chi2Mono/chi2Bi = 1.00117     d = -0.00011281     a =
 0.341963     a1 = 1.21507     t1 =0.00126612     t2 = 0.127764
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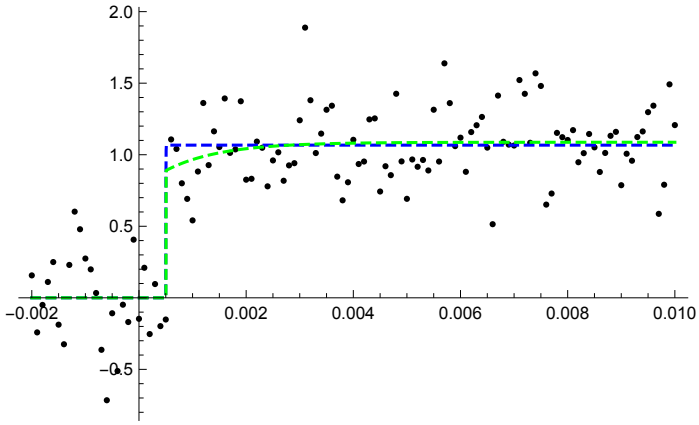

Mono: chi2 = 8.27599 d = 8.27599 a = 1.06701 t = 2.01413×10^{-6}

Bi: ratio chi2Mono/chi2Bi = 1.01744 d = 0.000503991 a = 1.08716 a1 = 0.889718 t1 = 5.82369×10^{-7} t2 = 0.00101507

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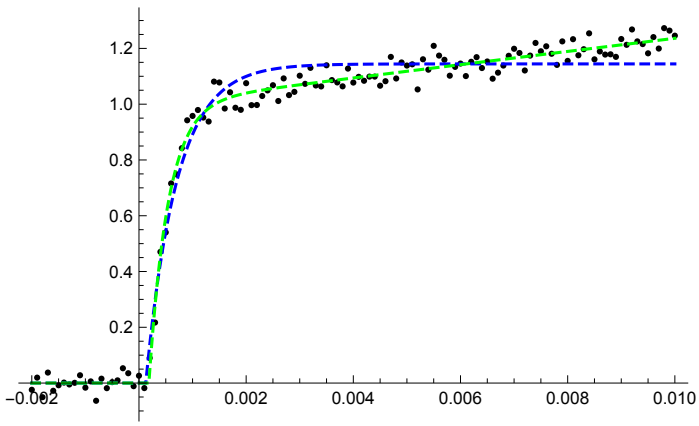
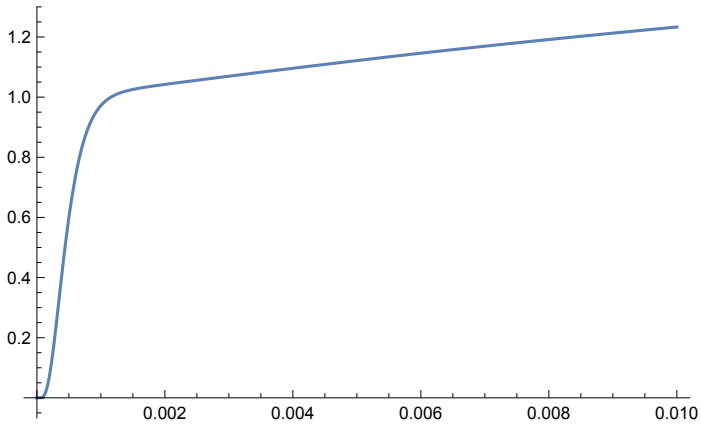
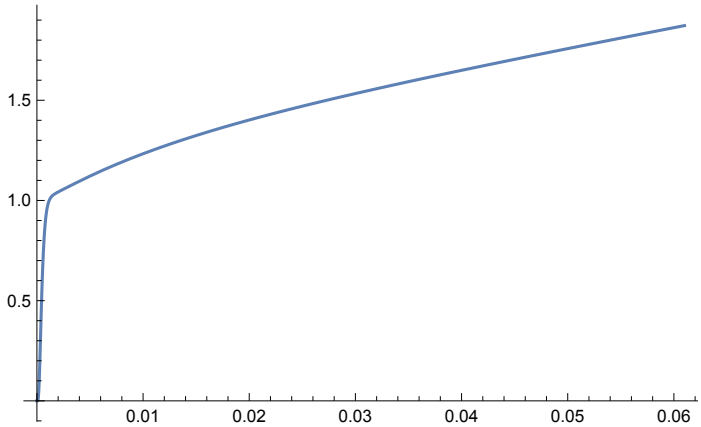


```
Mono: chi2 = 0.394183     d = 0.394183     a = 1.1444     t = 0.000577962
Bi: ratio chi2Mono/chi2Bi = 2.8292     d = 0.000185179     a =
 7.03428     a1 = 1.00178     t1 =0.000356914     t2 = 0.247618
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 19.0955
  uM         -------------------------------------------------------
-------------------------------------------------------------------------------------
  -------------------------
```



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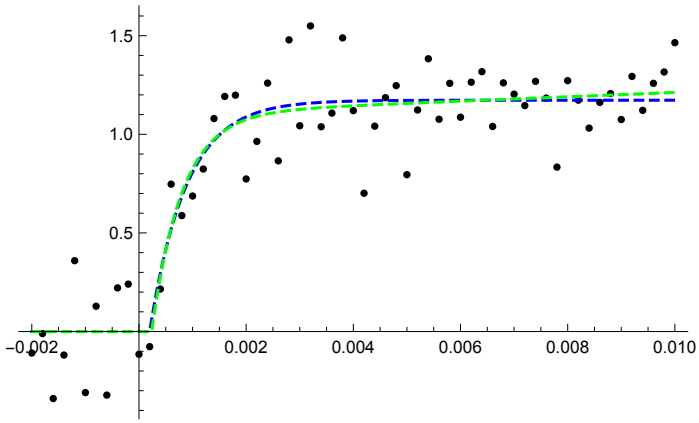


```
Mono: chi2 = 2.18071     d = 2.18071     a = 1.17288     t = 0.000684908
Bi: ratio chi2Mono/chi2Bi = 1.00979     d = 0.000235498
      a = 7.129     a1 = 1.10389     t1 =0.000568298     t2 = 0.538061
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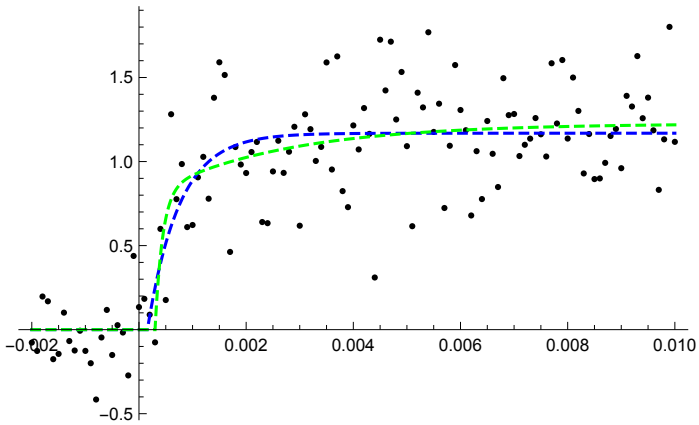


```
Mono: chi2 = 9.53591     d = 9.53591     a = 1.16857     t = 0.000591402
Bi: ratio chi2Mono/chi2Bi = 1.04261     d = 0.0003     a =
 1.22614     a1 = 0.82275     t1 =0.000138636     t2 = 0.00244973
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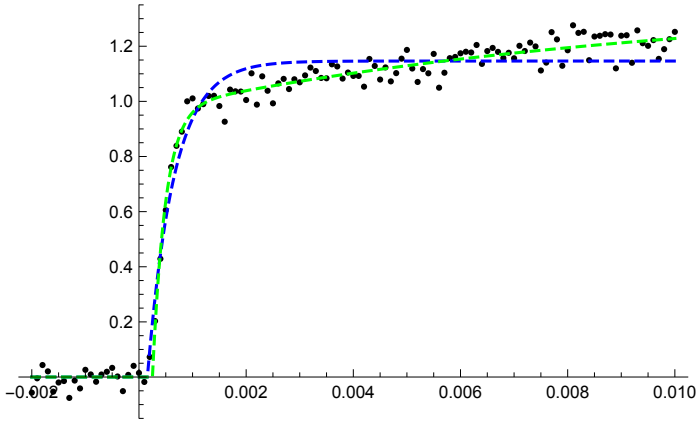


```
Mono: chi2 = 0.452937     d = 0.452937     a = 1.14627     t = 0.000495569
Bi: ratio chi2Mono/chi2Bi = 2.67085     d = 0.000251551     a =
 1.36853     a1 = 0.972051     t1 =0.0002399     t2 = 0.00939922
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----------------     Ca = 20.0596
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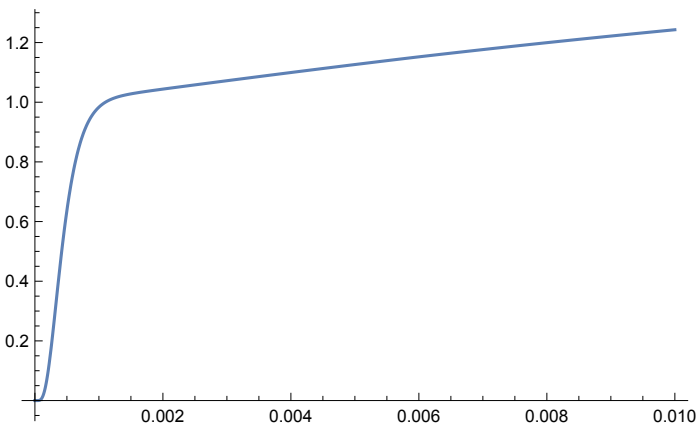

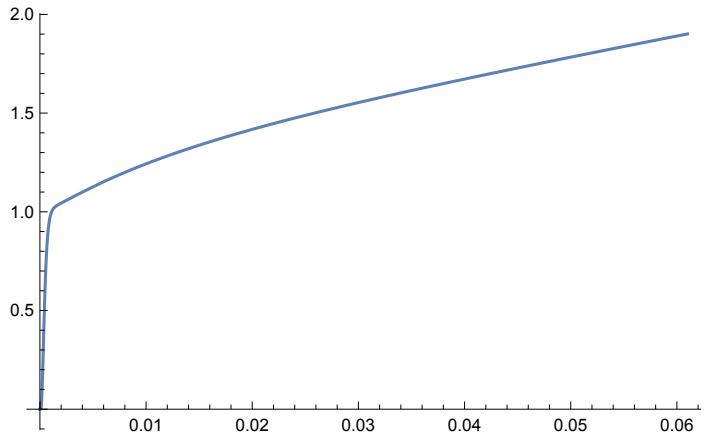

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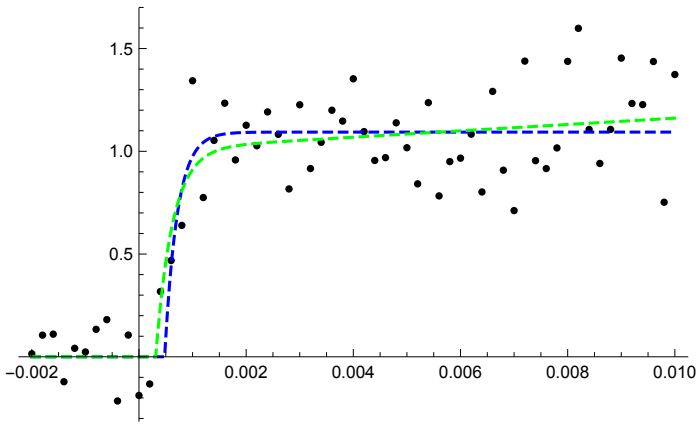


```
Mono: chi2 = 2.42315     d = 2.42315     a = 1.09332     t = 0.00023412
Bi: ratio chi2Mono/chi2Bi = 1.05584     d = 0.000312297     a =
 13.4407     a1 = 1.01143     t1 =0.00031157     t2 = 0.799232
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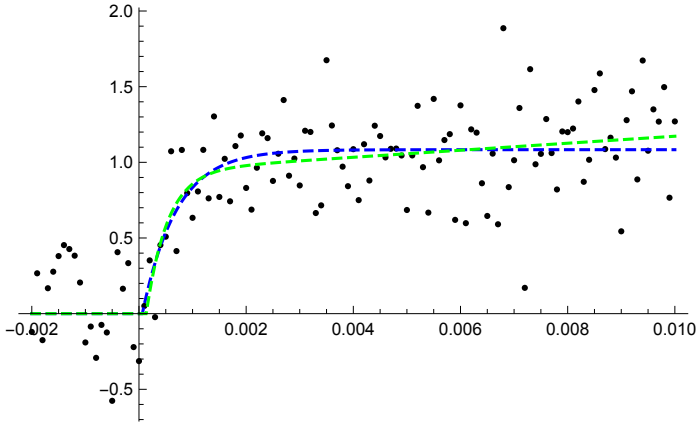


```
Mono: chi2 = 9.72982     d = 9.72982     a = 1.08352     t = 0.000638575
Bi: ratio chi2Mono/chi2Bi = 1.02443     d = 0.000135624     a =
 14.2402     a1 = 0.942995     t1 =0.000396061     t2 = 0.566733
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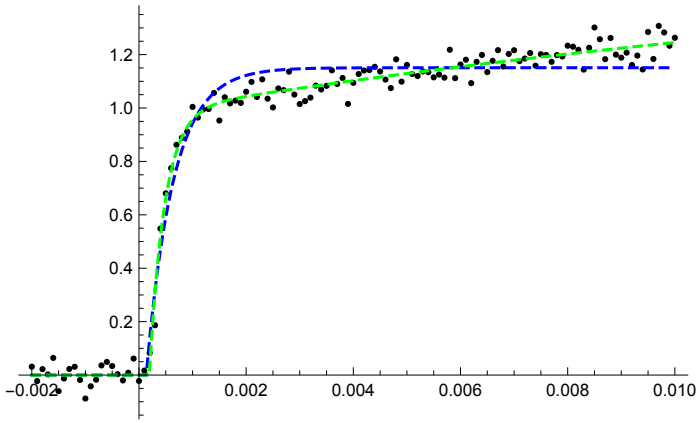

Mono: chi2 = 0.494636 d = 0.494636 a = 1.15086 t = 0.000505104

Bi: ratio chi2Mono/chi2Bi = 2.79008 d = 0.000193141 a = 1.67727 a1 = 0.988079 t1 =0.000284814 t2 = 0.0209841

--- Ca = 21.0761

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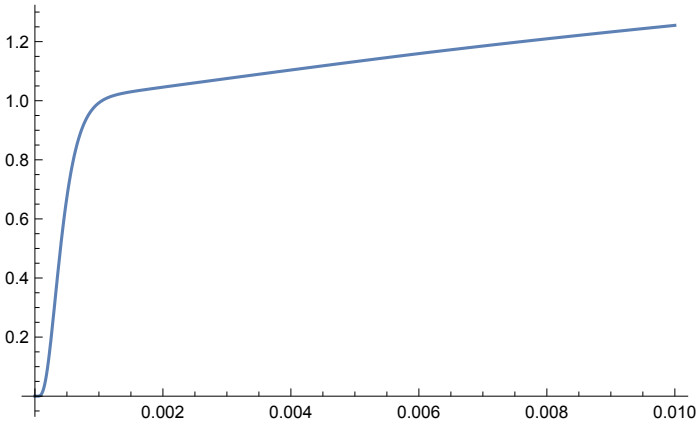

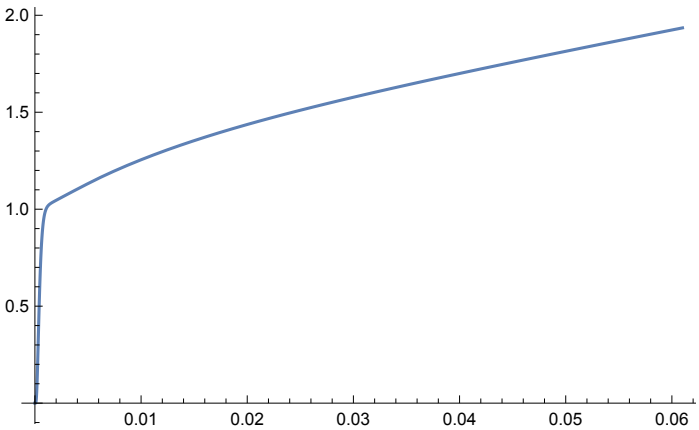

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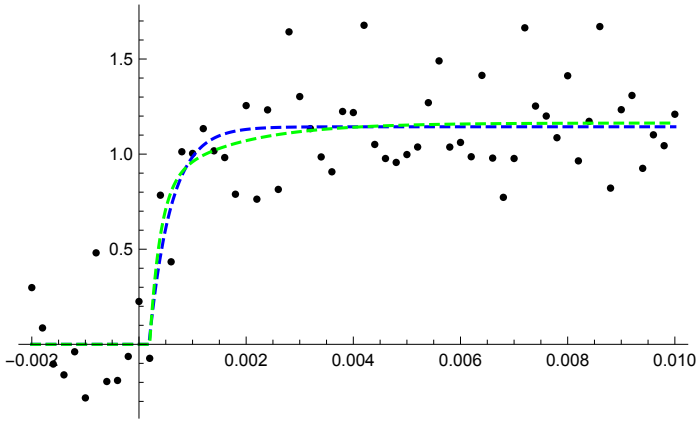


```
Mono: chi2 = 3.2757     d = 3.2757     a = 1.14372     t = 0.00041131
Bi: ratio chi2Mono/chi2Bi = 1.01878     d = 0.0002     a =
 1.16352     a1 = 0.828017     t1 =0.000197593     t2 = 0.00140028
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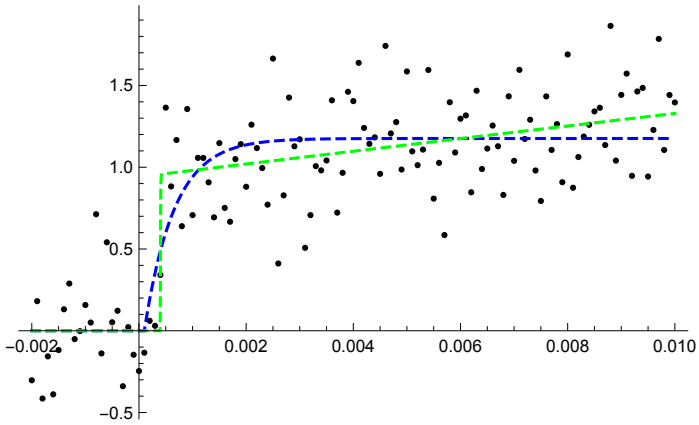

Mono: chi2 = 10.328 d = 10.328 a = 1.17583 t = 0.000558559

Bi: ratio chi2Mono/chi2Bi = 1.154 d = 0.000398311 a = 13.9634 a1 = 0.957161 t1 = 3.834×10^{-6} t2 = 0.331063

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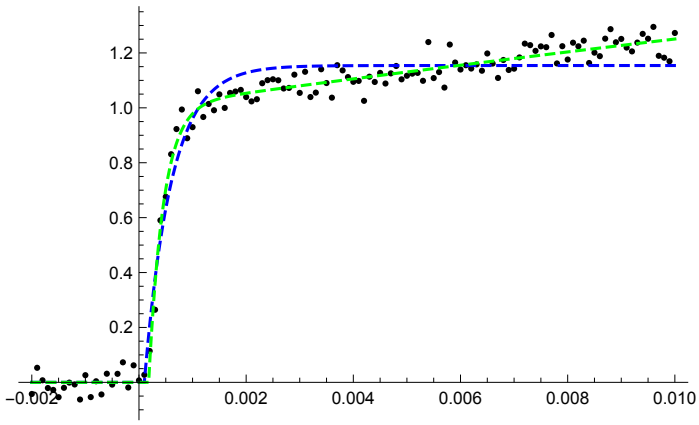


```
Mono: chi2 = 0.492194     d = 0.492194     a = 1.1541     t = 0.000503633
Bi: ratio chi2Mono/chi2Bi = 2.68904     d = 0.000180836     a =
 2.87448     a1 = 1.0064     t1 =0.000272225     t2 = 0.070079
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---------- Ca = 22.1498
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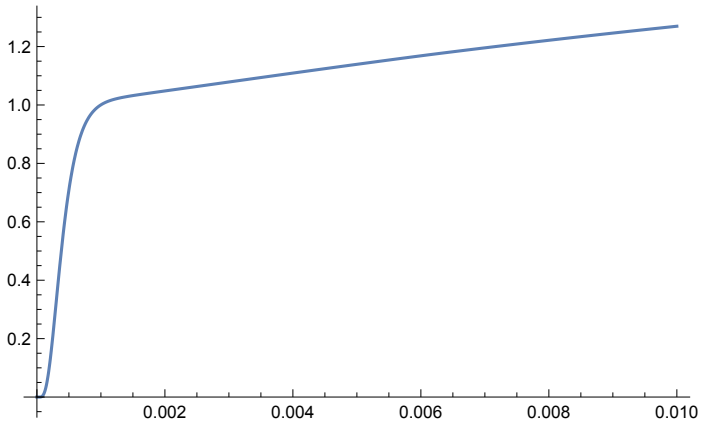

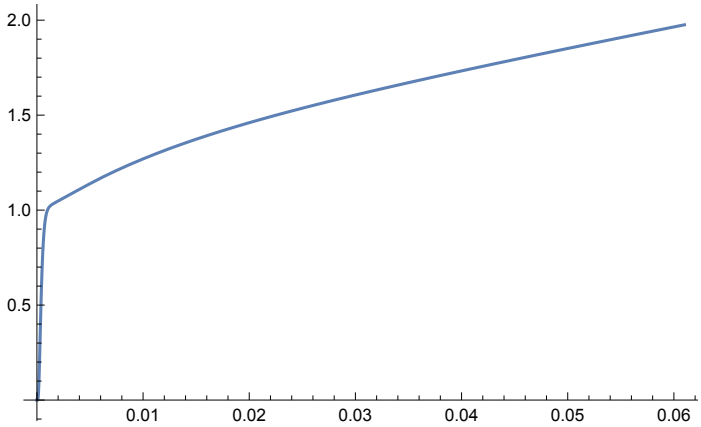

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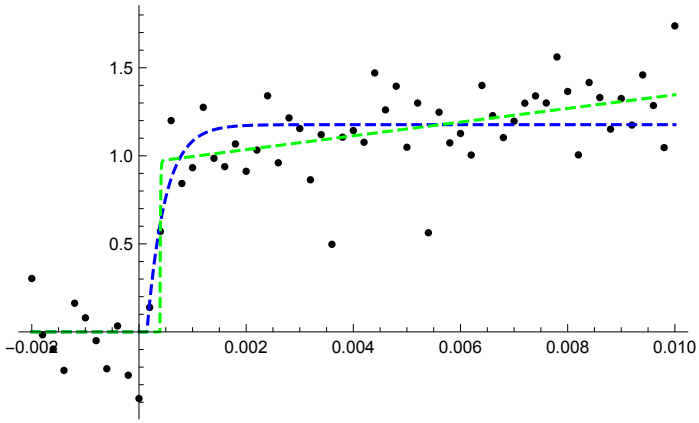

Mono: chi2 = 2.89911 d = 2.89911 a = 1.1769 t = 0.000336981

Bi: ratio chi2Mono/chi2Bi = 1.22339 d = 0.00039246 a = 18.1622 a1 = 0.971879 t1 = 8.53143×10^{-6} t2 = 0.436032

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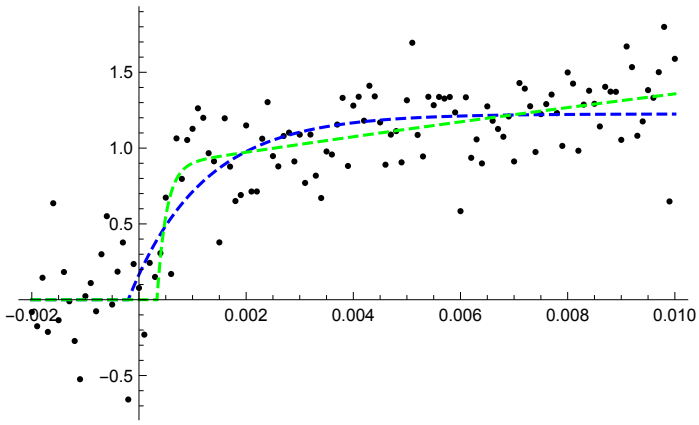


```
Mono: chi2 = 8.1081     d = 8.1081     a = 1.22512     t = 0.00137793
Bi: ratio chi2Mono/chi2Bi = 1.12962     d = 0.000336342     a =
 3.47711     a1 = 0.883998     t1 =0.000173218     t2 = 0.0479115
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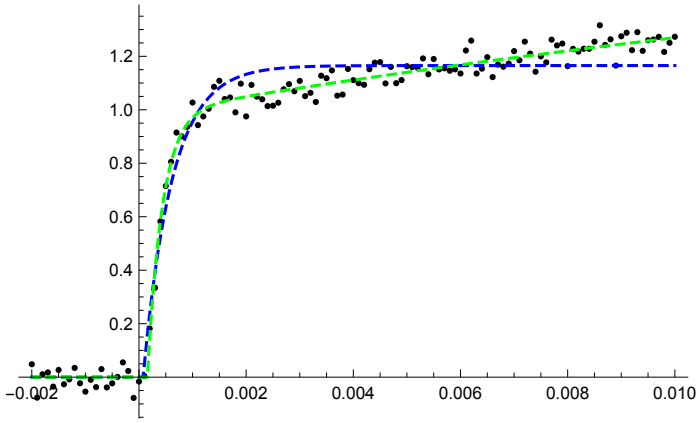


```
Mono: chi2 = 0.539237     d = 0.539237     a = 1.16534     t = 0.000537944
Bi: ratio chi2Mono/chi2Bi = 3.24252     d = 0.000157157     a =
 1.92441     a1 = 0.990413     t1 =0.000278648     t2 = 0.0277048
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 23.2819
  uM         -------------------------------------------------------
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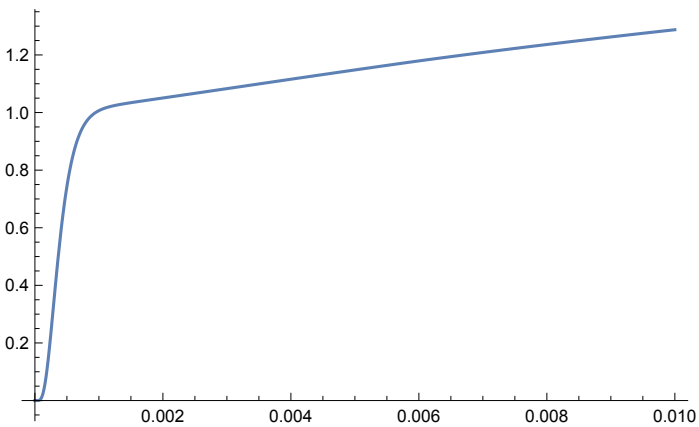

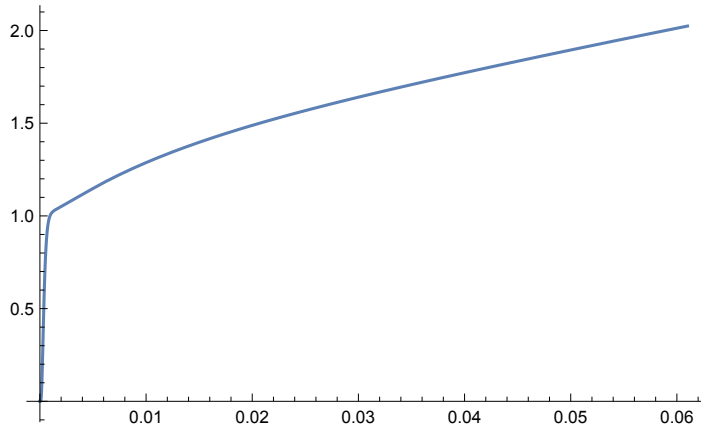

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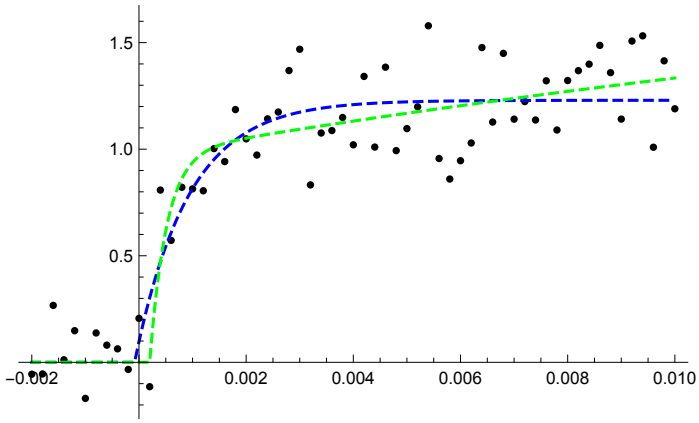


```
Mono: chi2 = 2.01202     d = 2.01202     a = 1.22938     t = 0.000995781
Bi: ratio chi2Mono/chi2Bi = 1.10769     d = 0.0002     a =
 2.17893     a1 = 0.979642     t1 =0.000312897     t2 = 0.027995
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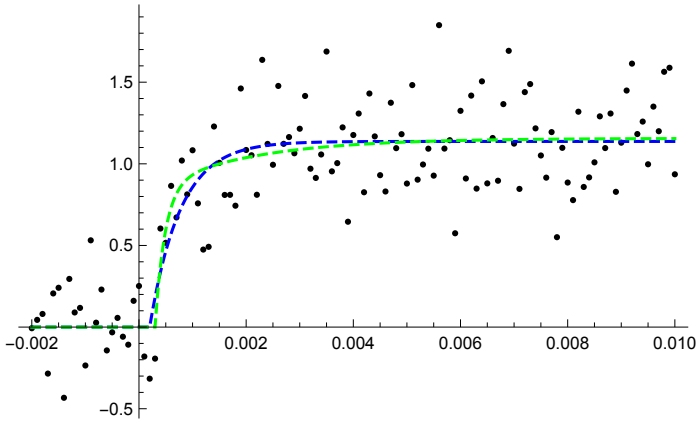


```
Mono: chi2 = 8.21895     d = 8.21895     a = 1.13713     t = 0.000571167
Bi: ratio chi2Mono/chi2Bi = 1.01839     d = 0.0003     a =
 1.15606     a1 = 0.855065     t1 =0.000185195     t2 = 0.00181411
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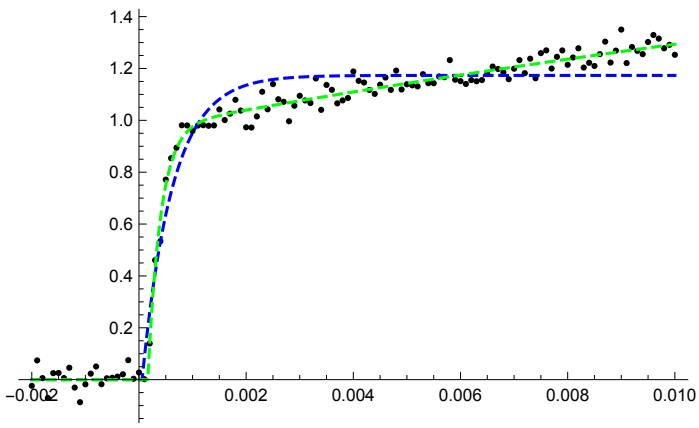

```
Mono: chi2 = 0.659935     d = 0.659935     a = 1.17324     t = 0.000565825
Bi: ratio chi2Mono/chi2Bi = 4.23705     d = 0.00016454     a =
 2.16371     a1 = 0.97202     t1 =0.000236597     t2 = 0.0312981
-------------------------------------------------------------------------------------
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----------------     Ca = 24.4782
  uM         -------------------------------------------------------
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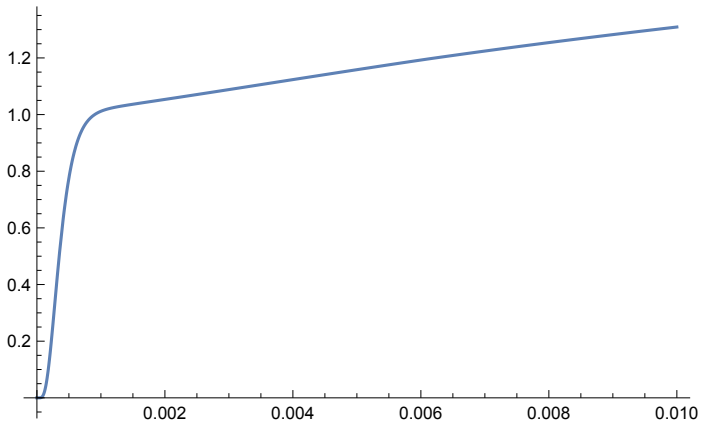

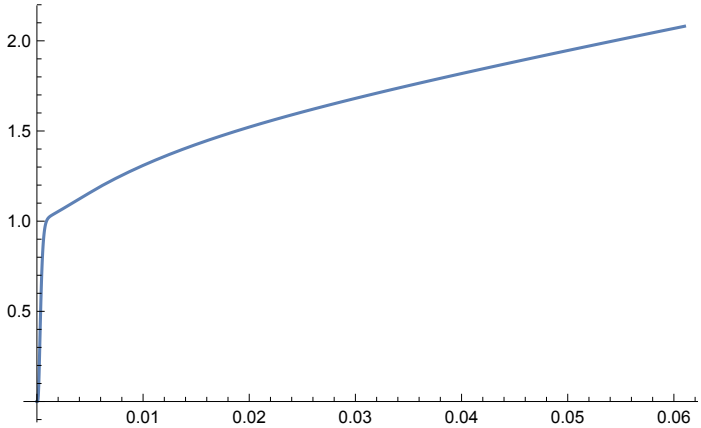


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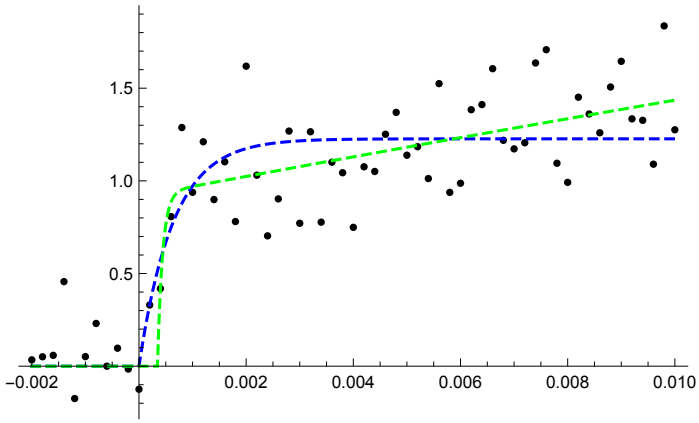


```
Mono: chi2 = 3.73482     d = 3.73482     a = 1.22679     t = 0.00063615

Bi: ratio chi2Mono/chi2Bi = 1.25746     d = 0.000345589     a =
 6.83433     a1 = 0.934898     t1 =0.0000939336     t2 = 0.108932

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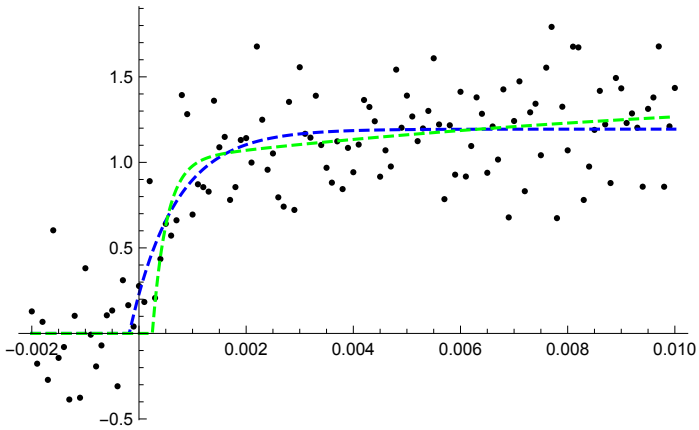


```
Mono: chi2 = 7.93261     d = 7.93261     a = 1.19426     t = 0.00084716
Bi: ratio chi2Mono/chi2Bi = 0.960285     d = 0.000249136     a =
 1.45518     a1 = 1.00756     t1 =0.000261906     t2 = 0.0112944
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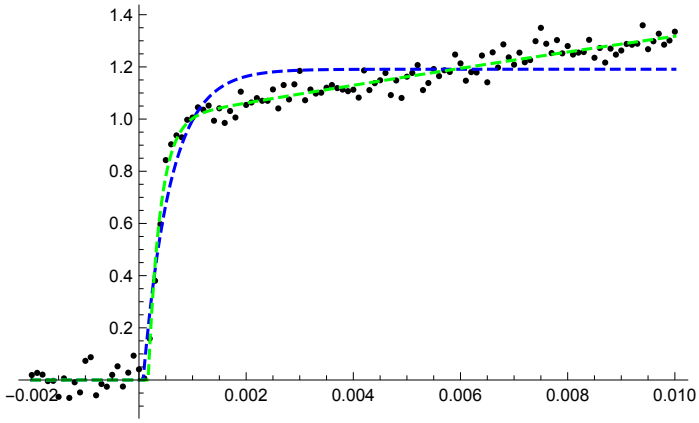


```
Mono: chi2 = 0.708235     d = 0.708235     a = 1.19101     t = 0.000509918
Bi: ratio chi2Mono/chi2Bi = 4.19144     d = 0.000170738     a =
 2.84525     a1 = 0.997602     t1 =0.000224399     t2 = 0.0517425
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----------------     Ca = 25.7412
  uM         -------------------------------------------------------
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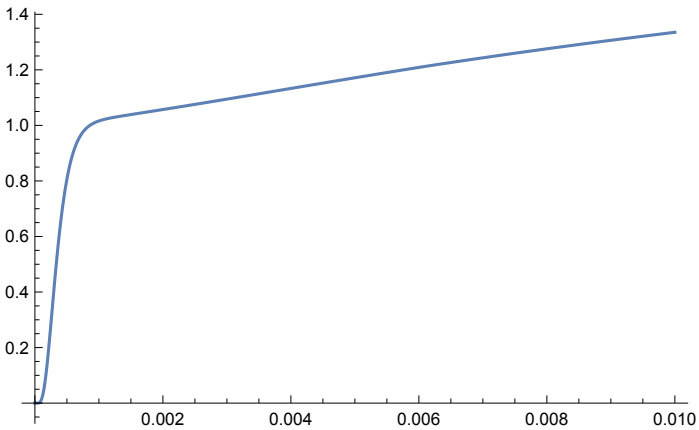

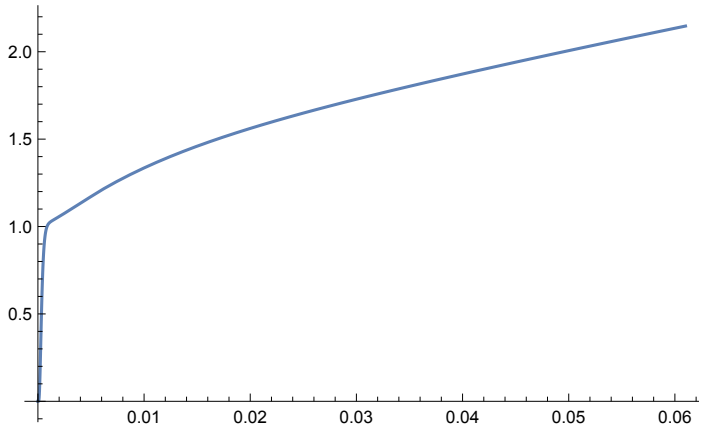

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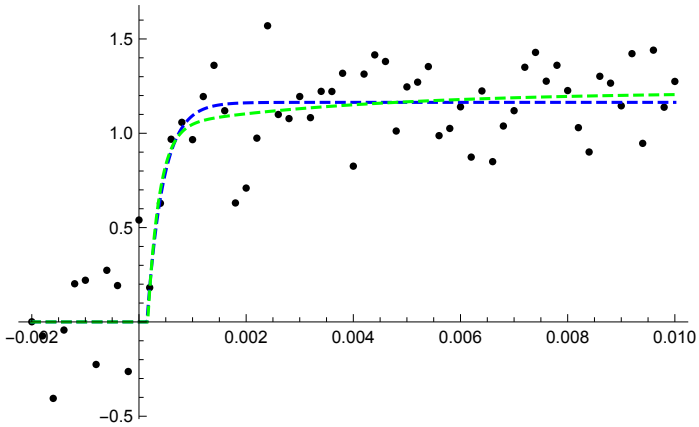


```
Mono: chi2 = 2.65309     d = 2.65309     a = 1.16391     t = 0.000303452
Bi: ratio chi2Mono/chi2Bi = 1.02388     d = 0.000162794
      a = 1.21888     a1 = 1.0311     t1 =0.00021561     t2 = 0.003771
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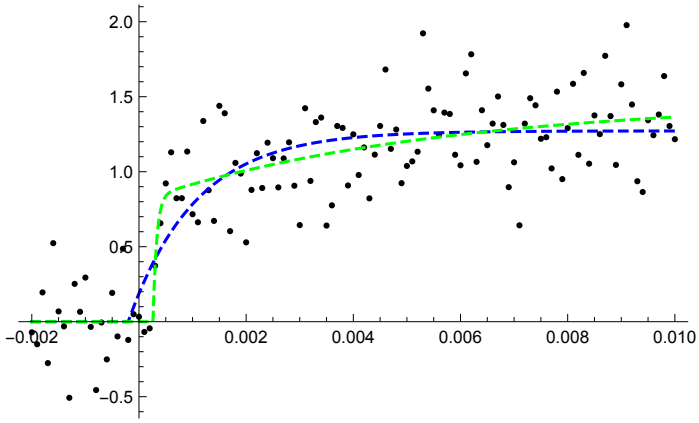


```
Mono: chi2 = 9.27783     d = 9.27783     a = 1.27191     t = 0.00125345
Bi: ratio chi2Mono/chi2Bi = 1.13928     d = 0.000261115     a =
 1.47563     a1 = 0.837024     t1 =0.0000698203     t2 = 0.00556963
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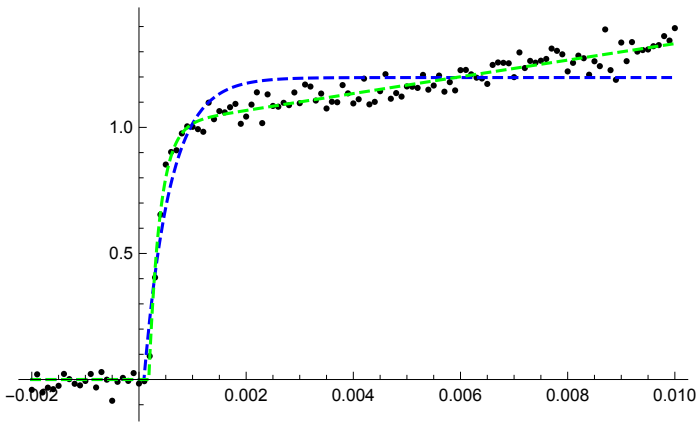

```
Mono: chi2 = 0.739943     d = 0.739943     a = 1.19767     t = 0.000482065
Bi: ratio chi2Mono/chi2Bi = 4.88133     d = 0.000182973     a =
 9.35183     a1 = 1.00595     t1 =0.000206599     t2 = 0.246171
-------------------------------------------------------------------------------------
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----------------     Ca = 29.9583
  uM         -------------------------------------------------------
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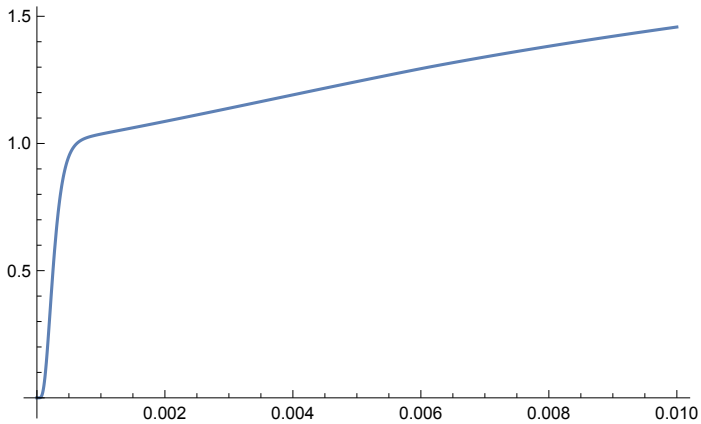

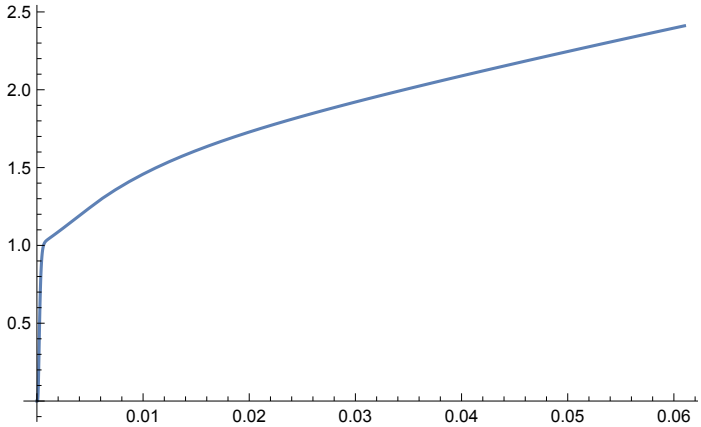


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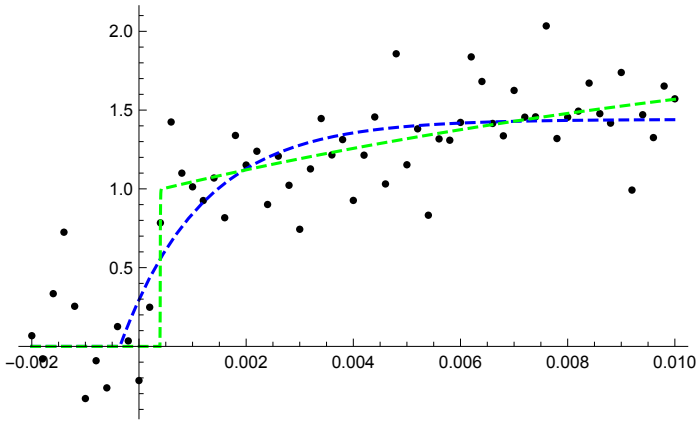

Mono: chi2 = 4.6695 d = 4.6695 a = 1.4409 t = 0.00154192

Bi: ratio chi2Mono/chi2Bi = 1.27868 d = 0.000394625 a = 2.17201 a1 = 0.9967 t1 = 3.48293×10^{-6} t2 = 0.014401

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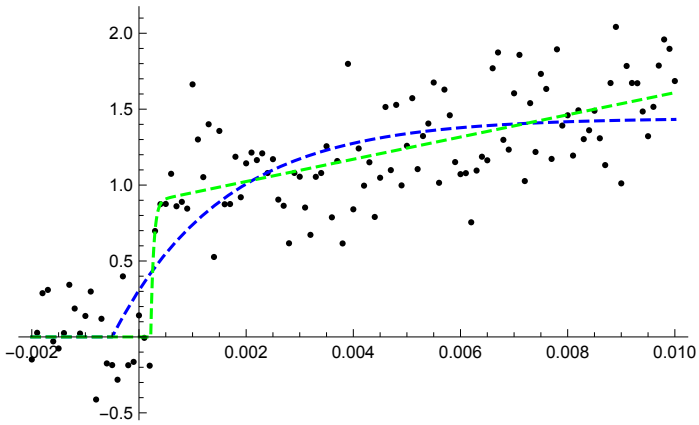


```
Mono: chi2 = 11.2986     d = 11.2986     a = 1.44169     t = 0.00208367
Bi: ratio chi2Mono/chi2Bi = 1.38403     d = 0.000219534     a =
 74.4167     a1 = 0.892583     t1 =0.000054014     t2 = 0.999077
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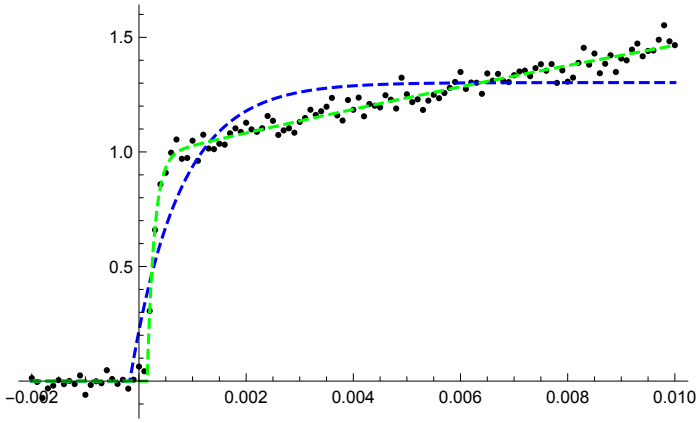


```
Mono: chi2 = 1.25715     d = 1.25715     a = 1.30261     t = 0.000923238
Bi: ratio chi2Mono/chi2Bi = 8.93114     d = 0.000151874     a =
 2.99086     a1 = 0.98141     t1 =0.000131749     t2 = 0.035805
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----------------     Ca = 31.4124
  uM         -------------------------------------------------------
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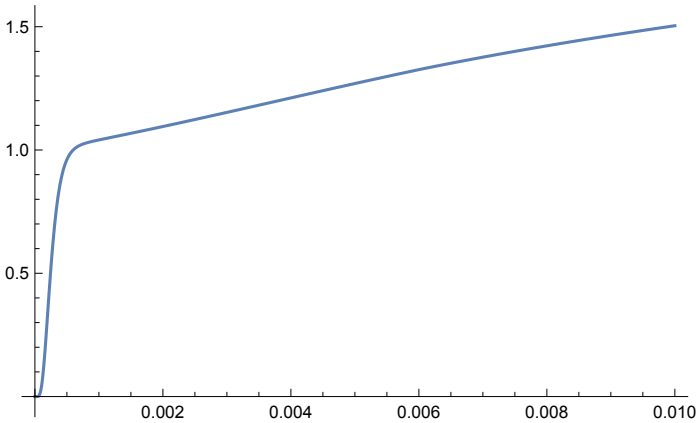

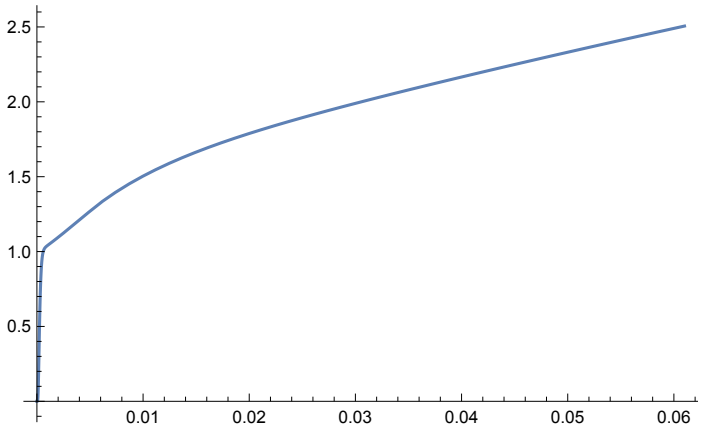

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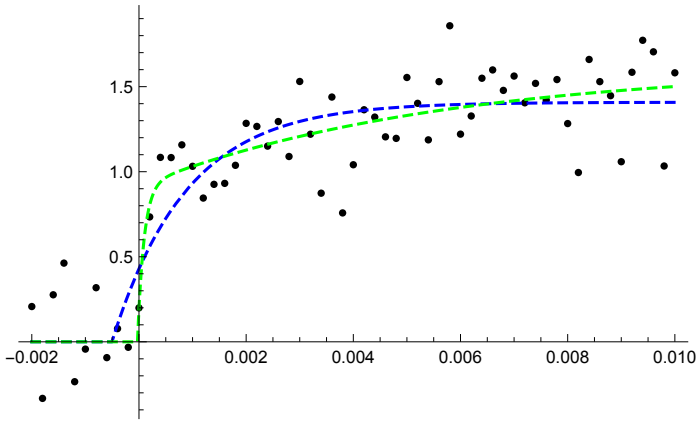


```
Mono: chi2 = 3.34946     d = 3.34946     a = 1.40835     t = 0.00138767
Bi: ratio chi2Mono/chi2Bi = 1.21896     d = -0.0000278803     a =
 1.61944     a1 = 0.913488     t1 =0.000120414     t2 = 0.00562434
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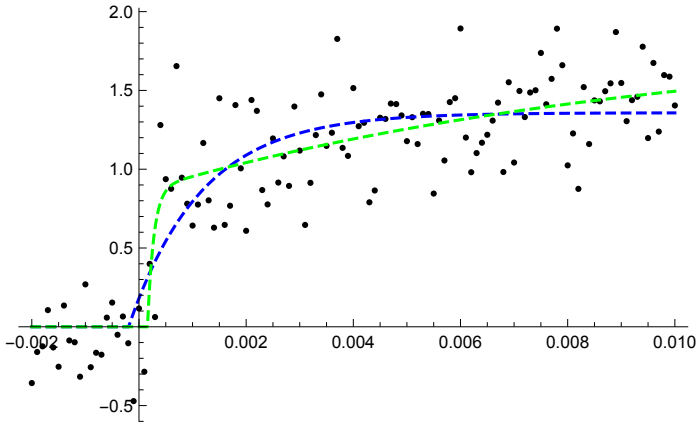


```
Mono: chi2 = 9.47959     d = 9.47959     a = 1.35809     t = 0.001355
Bi: ratio chi2Mono/chi2Bi = 1.21217     d = 0.000158982     a =
 1.85285     a1 = 0.873954     t1 =0.000116681     t2 = 0.00978465
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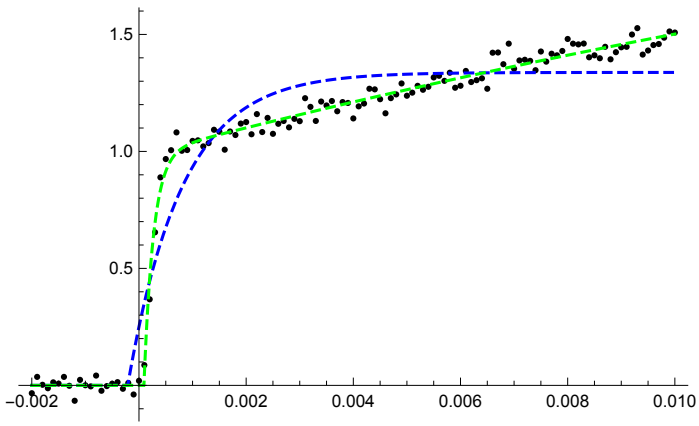

```
Mono: chi2 = 1.43376     d = 1.43376     a = 1.33767     t = 0.0010102
Bi: ratio chi2Mono/chi2Bi = 9.10849     d = 0.0000923636     a =
 2.80064     a1 = 0.988104     t1 =0.000176331     t2 = 0.0297436
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 32.938
  uM         -------------------------------------------------------
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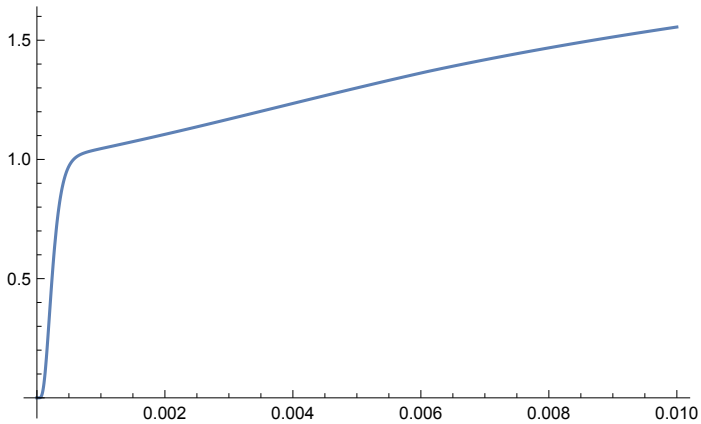
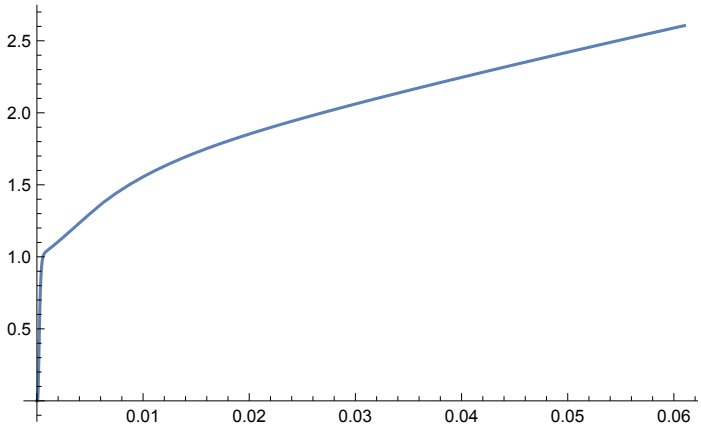
```



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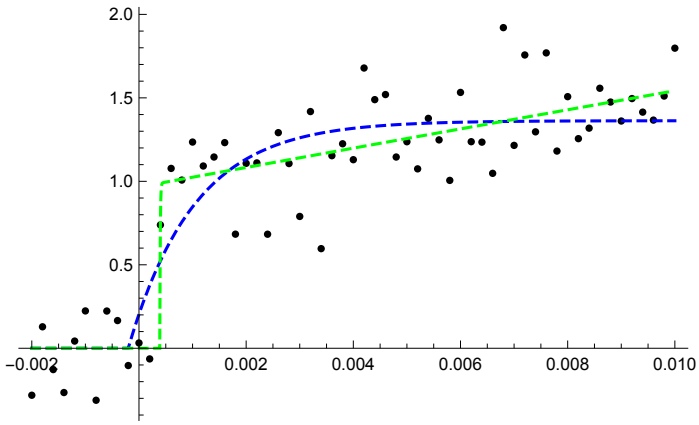

Mono: chi2 = 4.02791 d = 4.02791 a = 1.36311 t = 0.00123608

Bi: ratio chi2Mono/chi2Bi = 1.37351 d = 0.000388961 a = 20.0963 a1 = 0.988897 t1 = 8.04761×10^{-6} t2 = 0.326956

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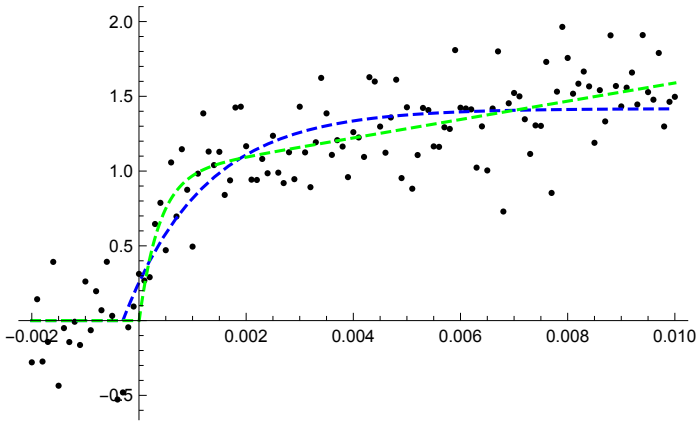

Mono: chi2 = 7.53369 d = 7.53369 a = 1.41766 t = 0.00150918

Bi: ratio chi2Mono/chi2Bi = 1.13536 d = 3.91719×10^{-6} a = 19.4167 a1 = 0.972503 t1 =0.000370425 t2 = 0.293951

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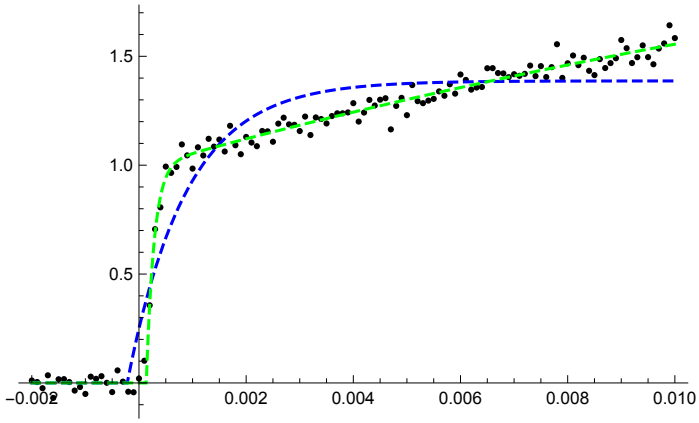


```
Mono: chi2 = 1.49121     d = 1.49121     a = 1.387     t = 0.00109898
Bi: ratio chi2Mono/chi2Bi = 8.11924     d = 0.000136375     a =
 2.64578     a1 = 0.99698     t1 =0.000144535     t2 = 0.0238405
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 34.5385
  uM          -------------------------------------------------------
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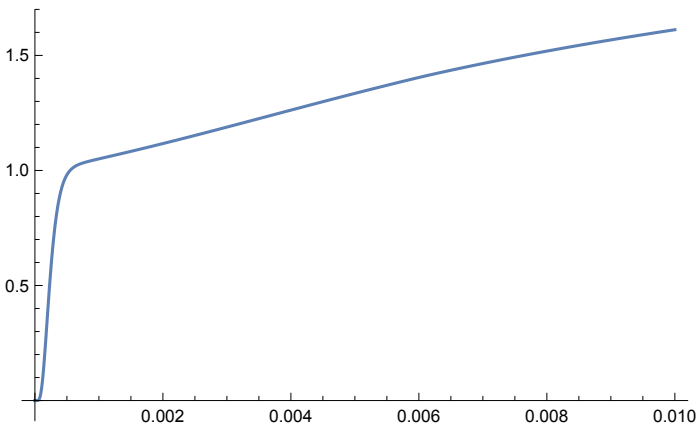

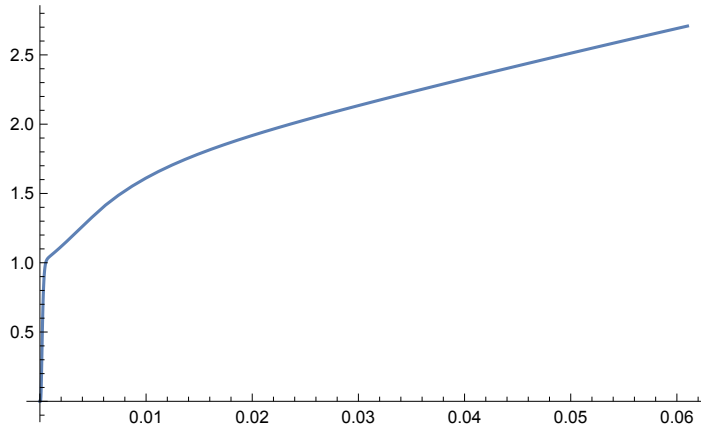

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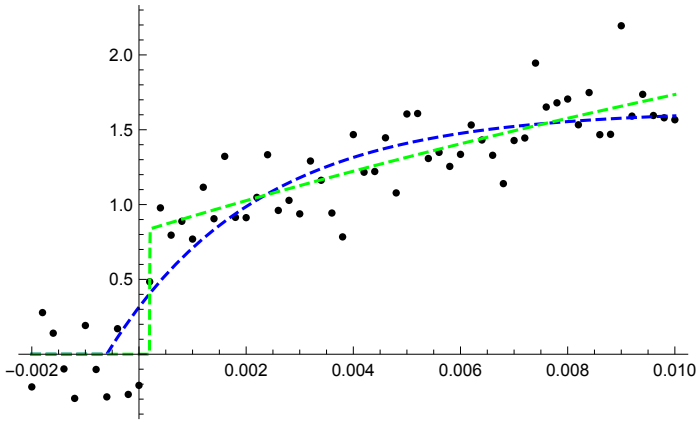

Mono: chi2 = 3.29592 d = 3.29592 a = 1.62966 t = 0.00279619

Bi: ratio chi2Mono/chi2Bi = 1.47367 d = 0.000197015 a = 3.88827 a1 = 0.836696 t1 =3.45338×10^{-6} t2 = 0.0281021

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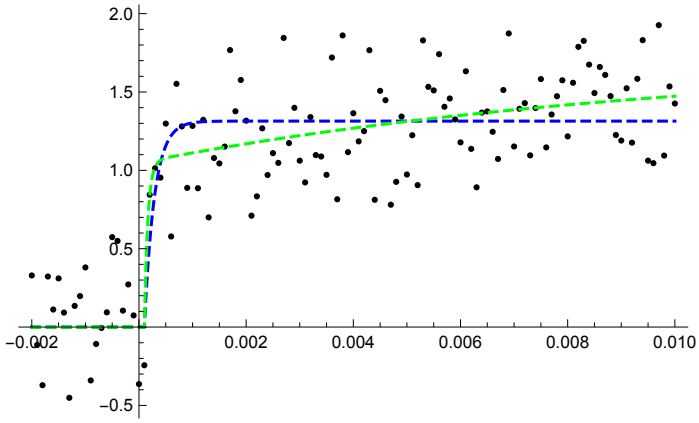


```
Mono: chi2 = 10.9205     d = 10.9205     a = 1.31416     t = 0.000188821
Bi: ratio chi2Mono/chi2Bi = 1.12367     d = 0.0001     a =
 1.7224     a1 = 1.05433     t1 =0.0000649239     t2 = 0.0100542
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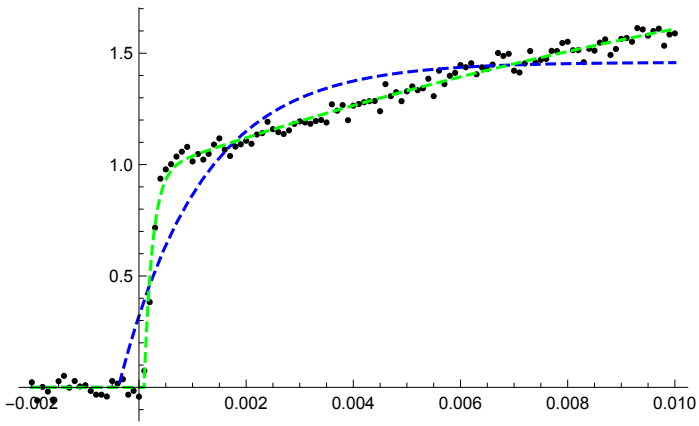

```
Mono: chi2 = 1.70425     d = 1.70425     a = 1.4594     t = 0.00153634
Bi: ratio chi2Mono/chi2Bi = 12.8486     d = 0.0000947141     a =
 2.40277     a1 = 0.965078     t1 =0.000153461     t2 = 0.0166766
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----------------     Ca = 36.2174
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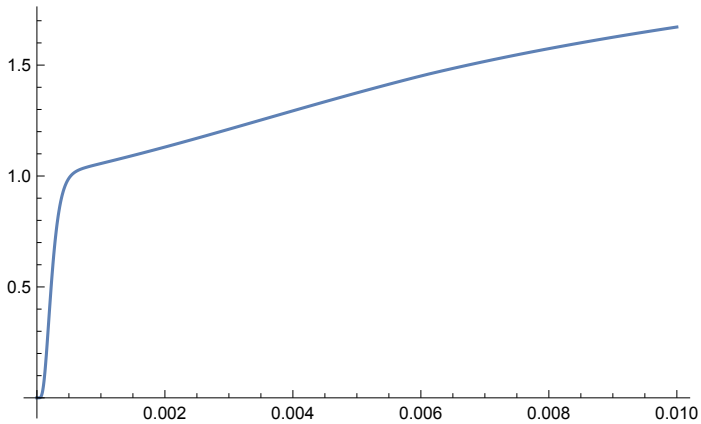

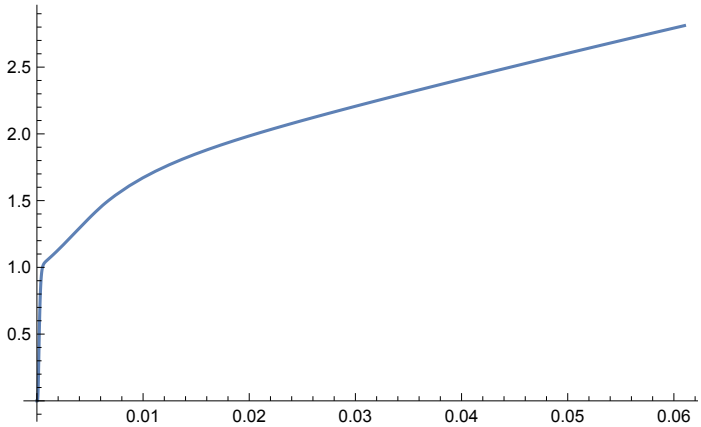


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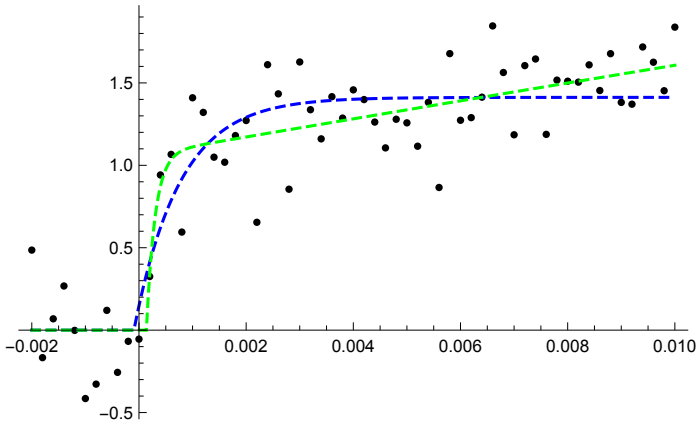


```
Mono: chi2 = 3.7195     d = 3.7195     a = 1.4122     t = 0.000852162

Bi: ratio chi2Mono/chi2Bi = 1.21074     d = 0.000139172
      a = 16.1776     a1 = 1.0689     t1 =0.000161414     t2 = 0.27193

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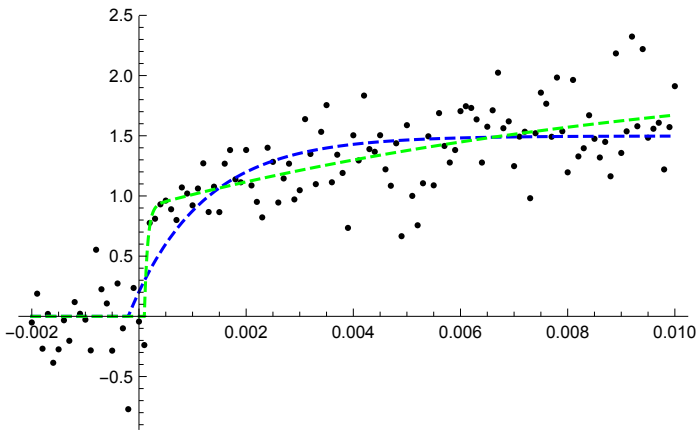


```
Mono: chi2 = 10.6745     d = 10.6745     a = 1.49796     t = 0.00136553
Bi: ratio chi2Mono/chi2Bi = 1.21946     d = 0.0001     a =
 2.13772     a1 = 0.907621     t1 =0.0000604368     t2 = 0.0101926
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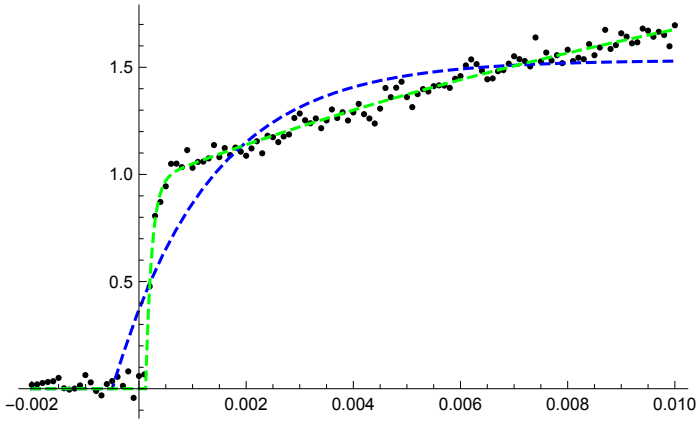


```
Mono: chi2 = 1.73531     d = 1.73531     a = 1.53325     t = 0.00179847
Bi: ratio chi2Mono/chi2Bi = 10.8592     d = 0.000124756     a =
 2.4779     a1 = 0.96768     t1 =0.000111944     t2 = 0.0155937
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----------------     Ca = 37.9787
  uM         -------------------------------------------------------
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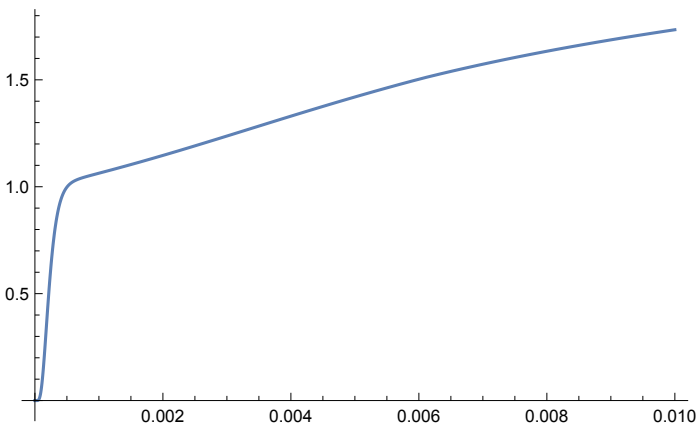

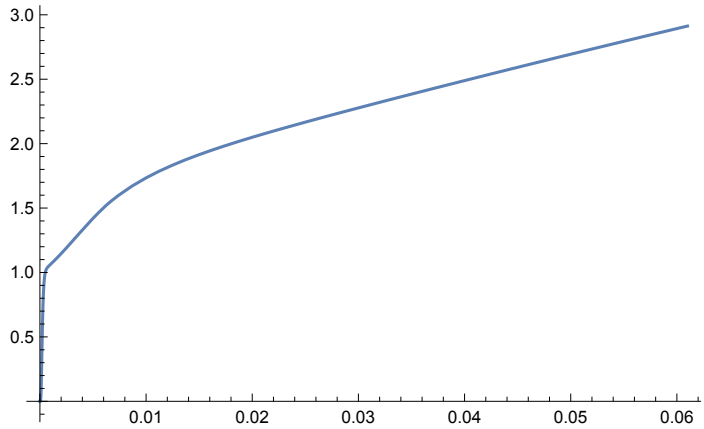

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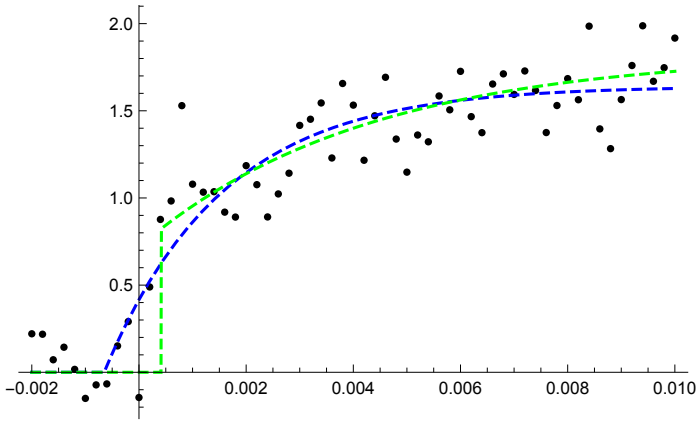

Mono: chi2 = 2.70836 d = 2.70836 a = 1.64125 t = 0.00221319

Bi: ratio chi2Mono/chi2Bi = 0.867637 d = 0.000414961 a = 1.82974 a1 = 0.823577 t1 = 2.53836×10^{-7} t2 = 0.0042144

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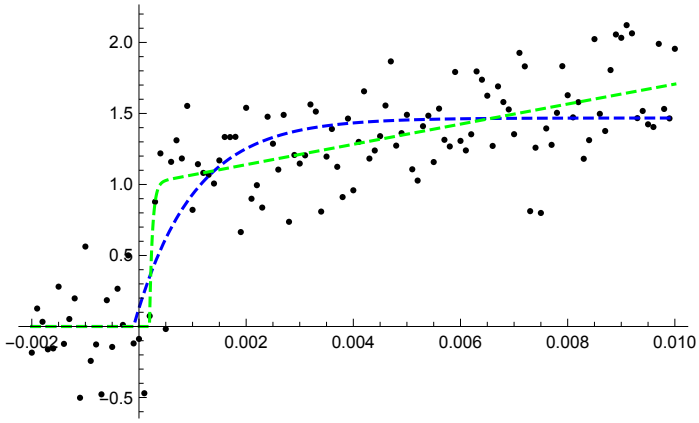


```
Mono: chi2 = 12.2838     d = 12.2838     a = 1.468     t = 0.00109492
Bi: ratio chi2Mono/chi2Bi = 1.26392     d = 0.000195785     a =
 23.2247     a1 = 1.00952     t1 =0.0000537949     t2 = 0.307483
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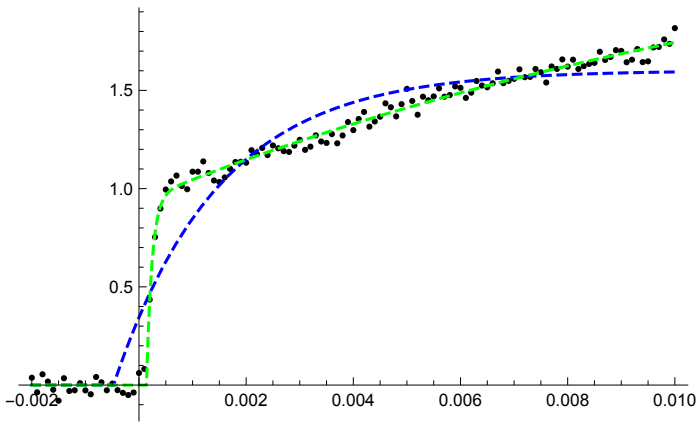

```
Mono: chi2 = 1.84595     d = 1.84595     a = 1.60147     t = 0.00195509
Bi: ratio chi2Mono/chi2Bi = 12.049     d = 0.000140482     a =
 2.53108     a1 = 0.953194     t1 =0.000101525     t2 = 0.0141726
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----------------     Ca = 39.8264
  uM         -------------------------------------------------------
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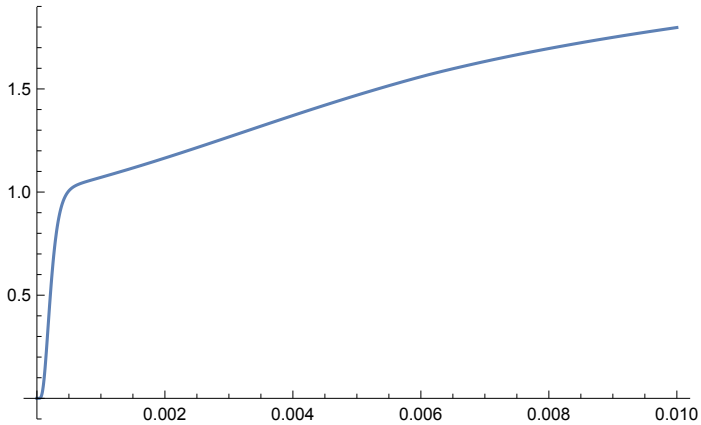

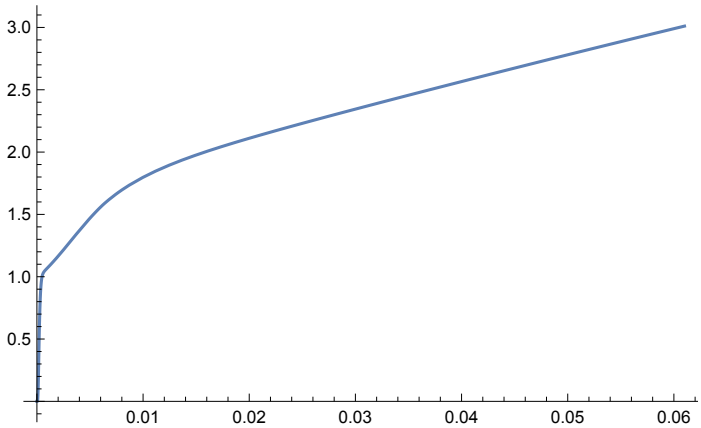


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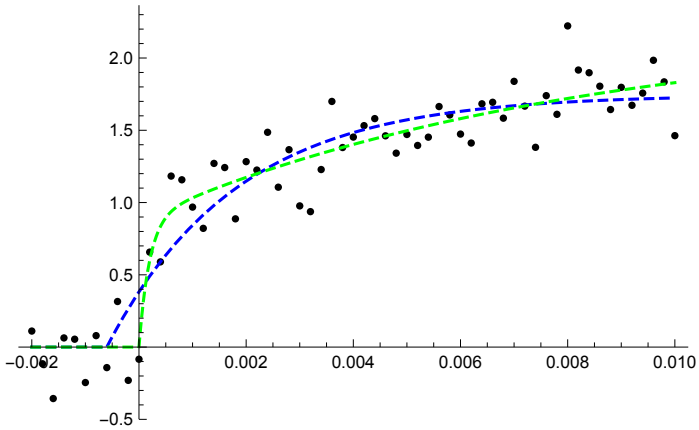

Mono: chi2 = 2.80509 d = 2.80509 a = 1.74574 t = 0.00242466

Bi: ratio chi2Mono/chi2Bi = 1.3978 d = -1.88211×10^{-17} a = 2.22248 a1 = 0.88262 t1 =0.000195186 t2 = 0.00815489

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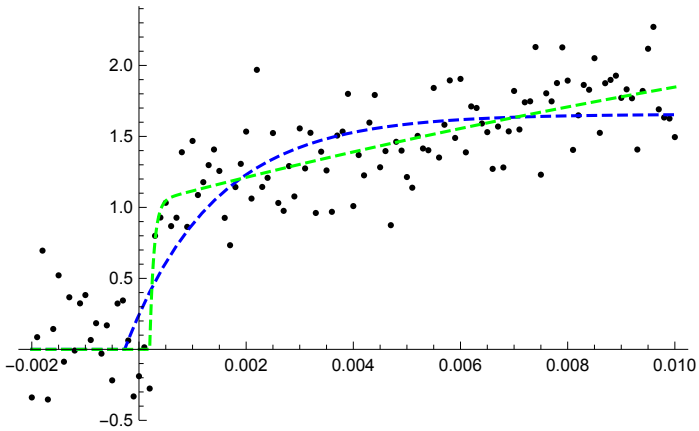


```
Mono: chi2 = 10.574      d = 10.574      a = 1.65637      t = 0.00166644
Bi: ratio chi2Mono/chi2Bi = 1.38665      d = 0.0002      a =
 3.46835      a1 = 1.03707      t1 =0.0000772784      t2 = 0.0241672
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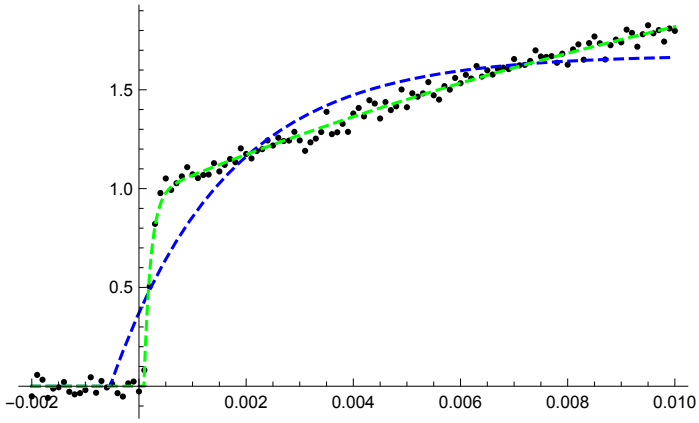


```
Mono: chi2 = 2.03011     d = 2.03011     a = 1.67616     t = 0.00214706
Bi: ratio chi2Mono/chi2Bi = 13.8844     d = 0.0000921107     a =
 2.89877     a1 = 0.967946     t1 =0.000124179     t2 = 0.0170363
------------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 41.7651
  uM         -------------------------------------------------------
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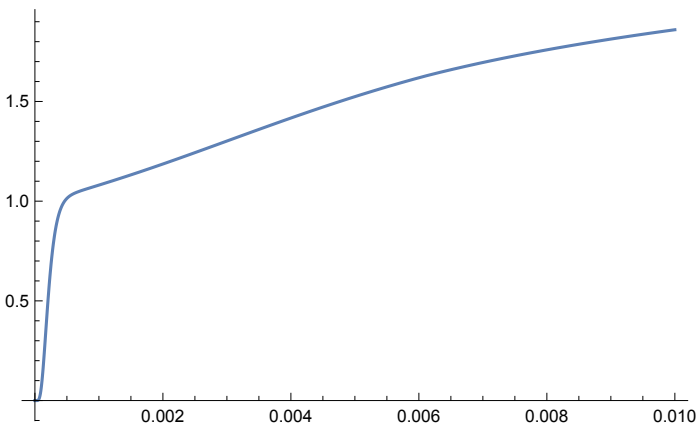

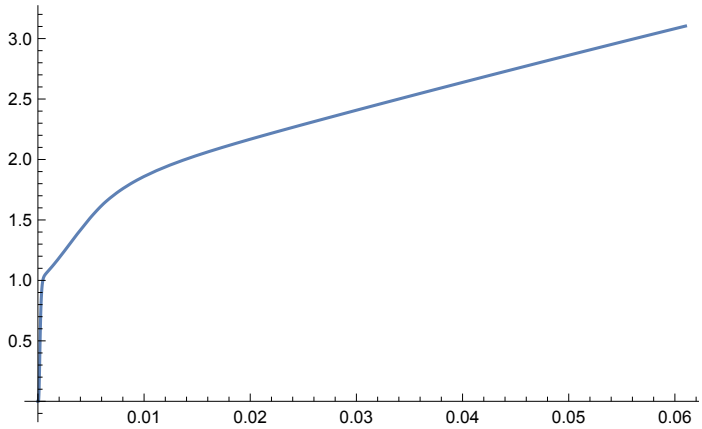

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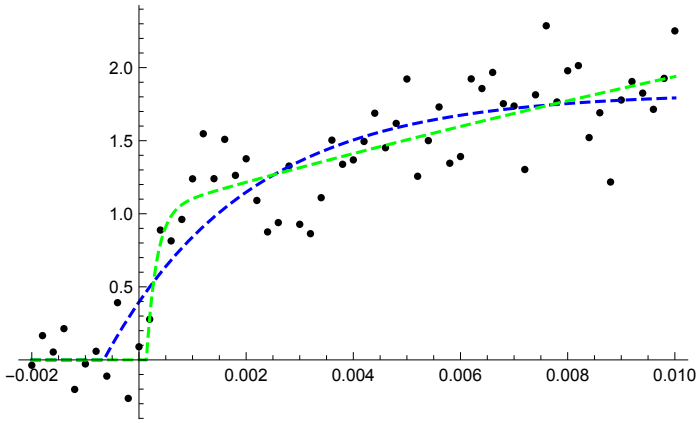


```
Mono: chi2 = 4.43476     d = 4.43476     a = 1.82694     t = 0.002683
Bi: ratio chi2Mono/chi2Bi = 1.30874     d = 0.000138729     a =
 4.81948     a1 = 1.02278     t1 =0.000188408     t2 = 0.0357172
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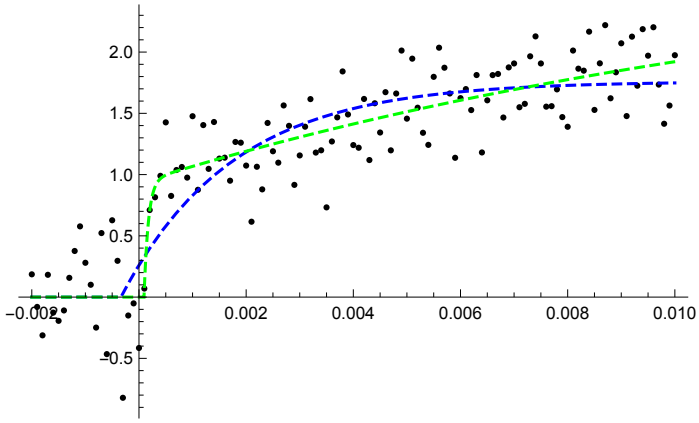


```
Mono: chi2 = 11.7563     d = 11.7563     a = 1.76068     t = 0.00209095
Bi: ratio chi2Mono/chi2Bi = 1.31188     d = 0.0000940049     a =
 2.8991     a1 = 0.947455     t1 =0.000081511     t2 = 0.0143335
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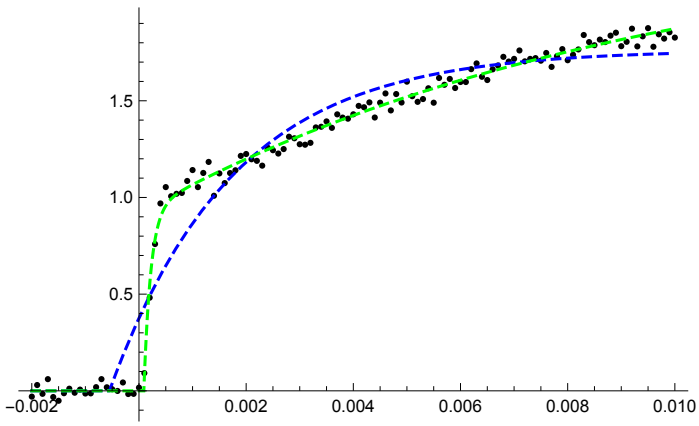

```
Mono: chi2 = 1.78306     d = 1.78306     a = 1.76283     t = 0.00229426
Bi: ratio chi2Mono/chi2Bi = 10.0705     d = 0.0000906156     a =
 2.37641     a1 = 0.934076     t1 =0.00012893     t2 = 0.00941646
-------------------------------------------------------------------------------------
  -------------------------
----------------     Ca = 43.7978
  uM         -------------------------------------------------------
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  -------------------------
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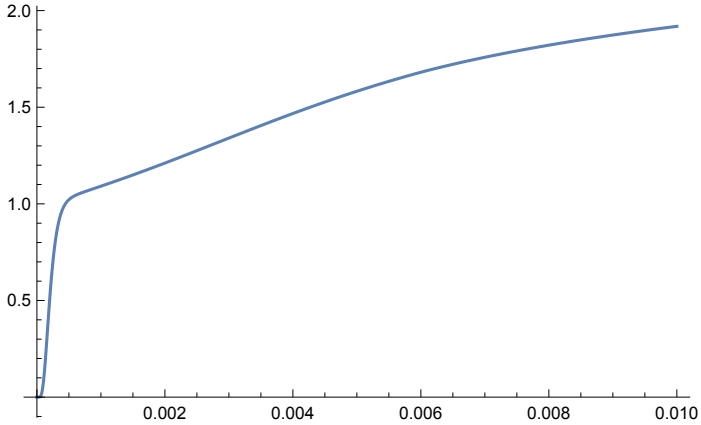

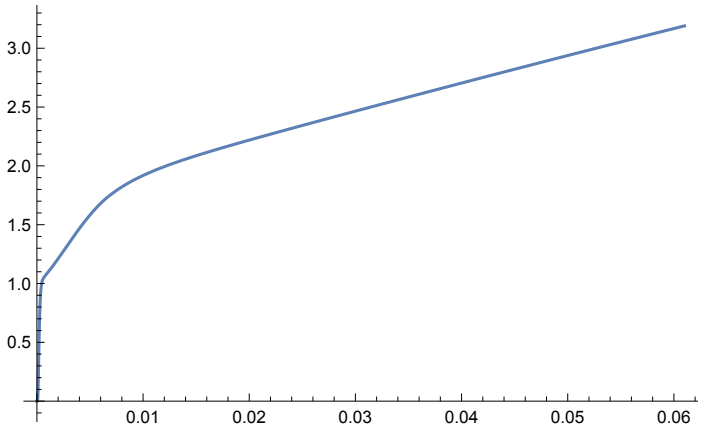


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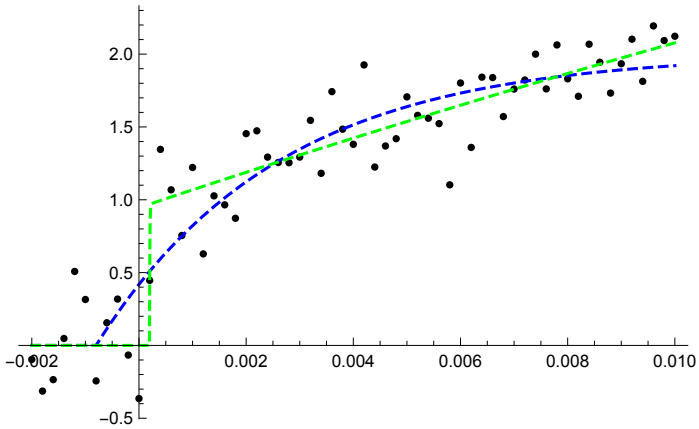

Mono: chi2 = 4.13316 d = 4.13316 a = 2.00506 t = 0.00340865

Bi: ratio chi2Mono/chi2Bi = 1.4402 d = 0.000196227 a = 7.76963 a1 = 0.969772 t1 = 6.12786×10^{-6} t2 = 0.0551424

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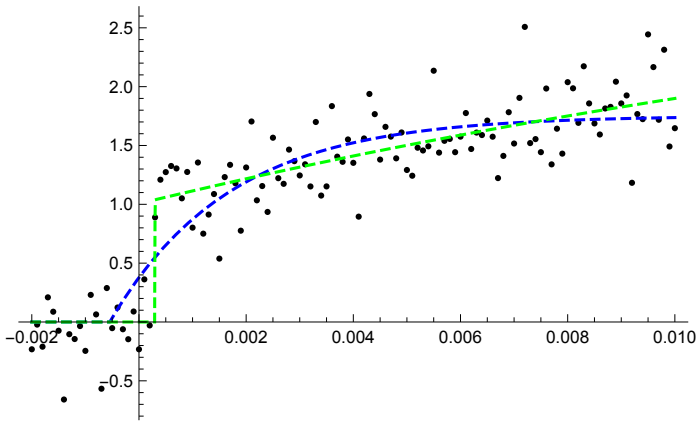

Mono: chi2 = 10.6382 d = 10.6382 a = 1.75271 t = 0.00223638

Bi: ratio chi2Mono/chi2Bi = 1.31572 d = 0.000293731 a = 3.52775 a1 = 1.03805 t1 = 3.23479×10^{-6} t2 = 0.022854

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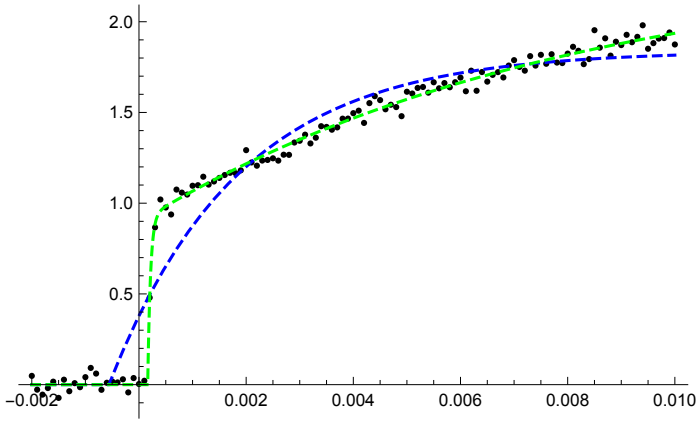


```
Mono: chi2 = 1.83378     d = 1.83378     a = 1.8389     t = 0.00241301
Bi: ratio chi2Mono/chi2Bi = 10.5599     d = 0.000163244     a =
 2.35877     a1 = 0.924707     t1 =0.0000515164     t2 = 0.00804887
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----------------     Ca = 45.9306
  uM         -------------------------------------------------------
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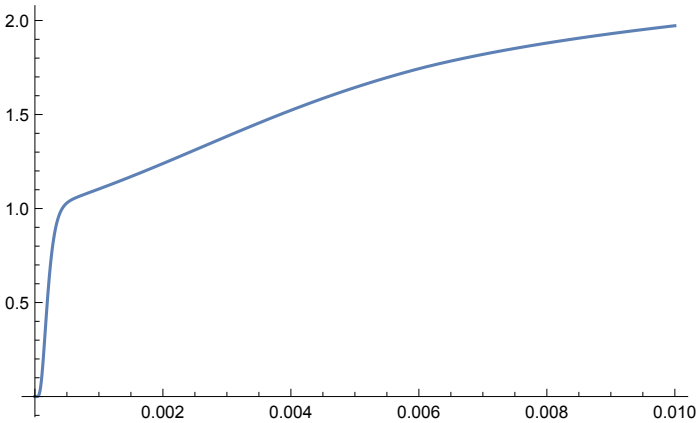

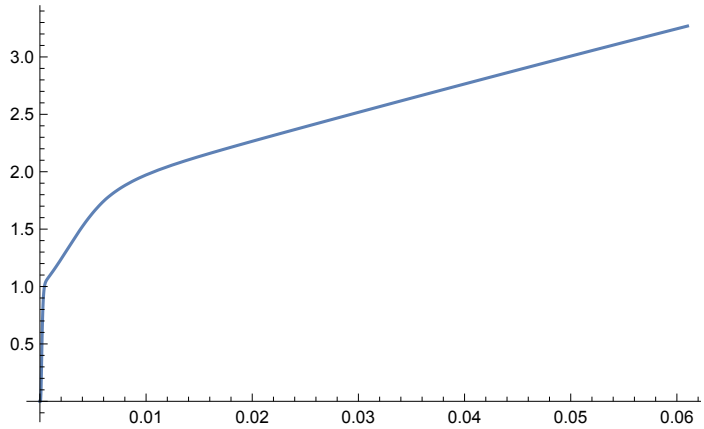

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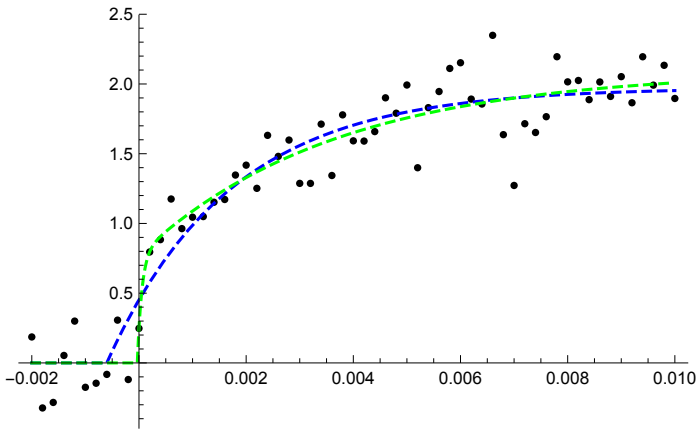


```
Mono: chi2 = 2.66112     d = 2.66112     a = 1.97243     t = 0.00230294
Bi: ratio chi2Mono/chi2Bi = 1.15734     d = -0.0000309807     a =
 2.09523     a1 = 0.763104     t1 =0.0000835847     t2 = 0.00367253
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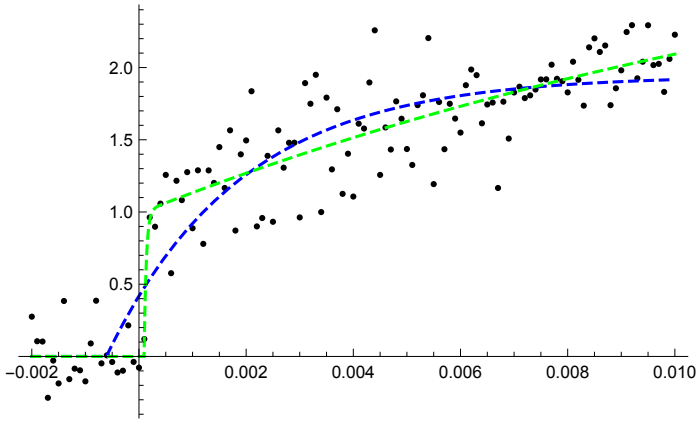


```
Mono: chi2 = 9.07981     d = 9.07981     a = 1.94446     t = 0.00250262
Bi: ratio chi2Mono/chi2Bi = 1.34244     d = 0.000094683     a =
 3.36931     a1 = 1.00407     t1 =0.0000415148     t2 = 0.0160655
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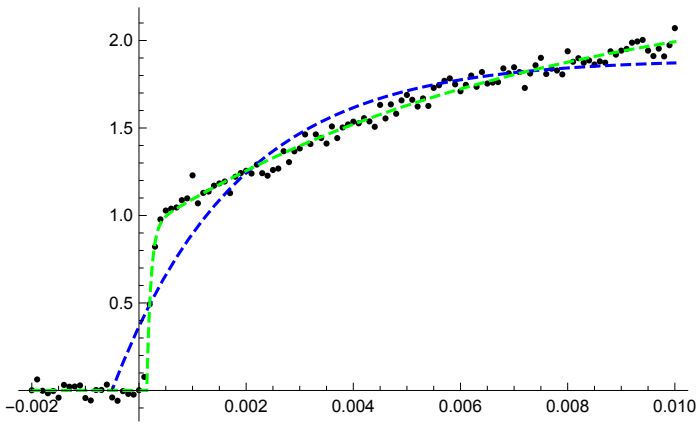

```
Mono: chi2 = 1.83473     d = 1.83473     a = 1.89325     t = 0.00234246
Bi: ratio chi2Mono/chi2Bi = 9.28884     d = 0.000146119     a =
 2.36232     a1 = 0.935441     t1 =0.000075193     t2 = 0.00729293
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----------------     Ca = 48.1689
  uM         -------------------------------------------------------
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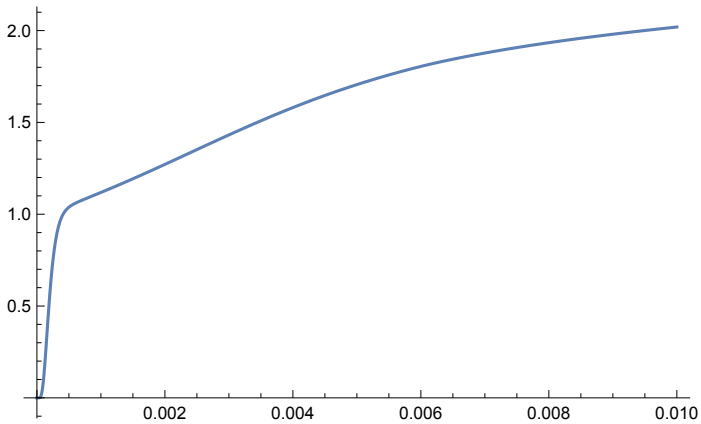

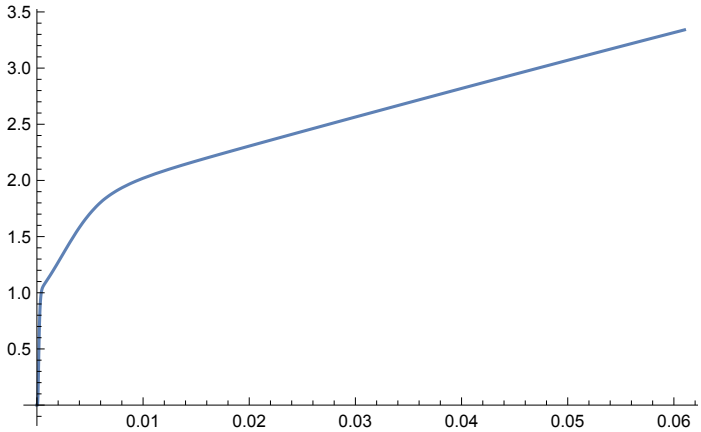


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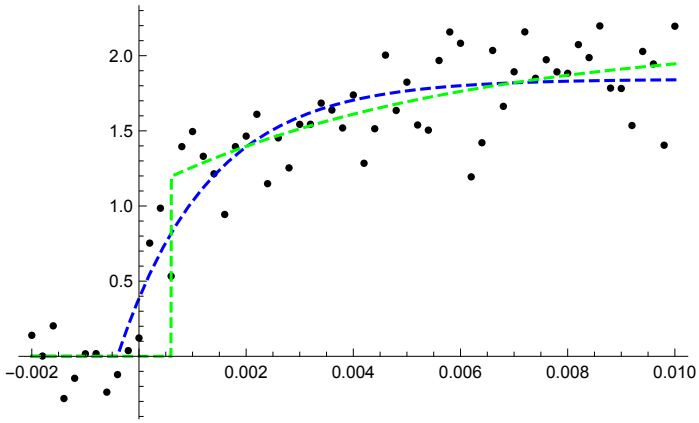

Mono: chi2 = 3.53098 d = 3.53098 a = 1.8436 t = 0.00170342

Bi: ratio chi2Mono/chi2Bi = 0.821414 d = 0.000599167 a = 2.12917 a1 = 1.19618 t1 = 1.41317×10^{-6} t2 = 0.00578138

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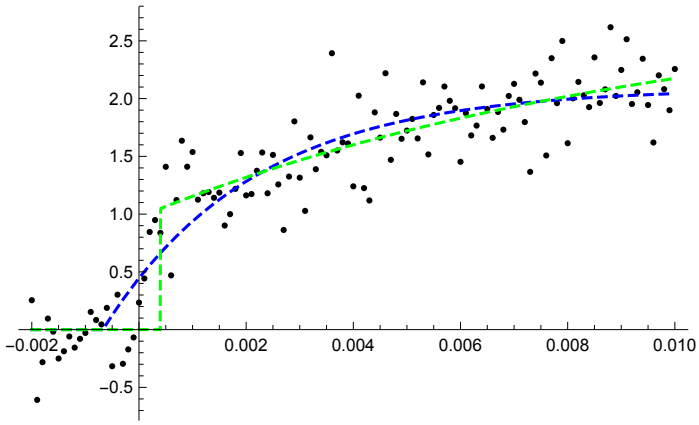

Mono: chi2 = 10.1696 d = 10.1696 a = 2.08953 t = 0.00280424

Bi: ratio chi2Mono/chi2Bi = 1.02062 d = 0.000396909 a = 2.87685 a1 = 1.04787 t1 =1.92911×10^{-6} t2 = 0.0100283

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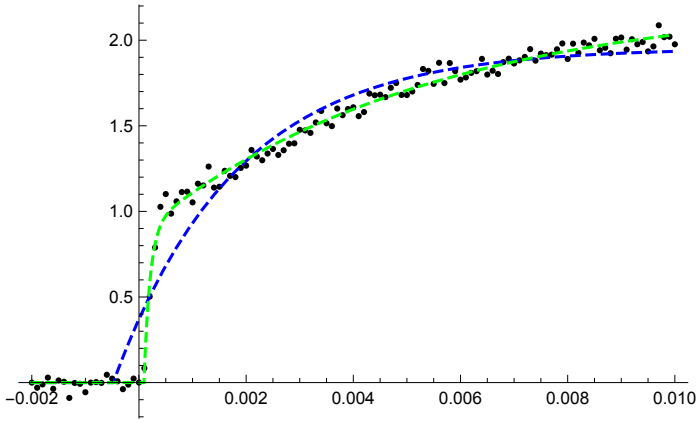


```
Mono: chi2 = 1.57034     d = 1.57034     a = 1.95457     t = 0.00228217
Bi: ratio chi2Mono/chi2Bi = 7.18135     d = 0.0000923503     a =
 2.24034     a1 = 0.899717     t1 =0.000113146     t2 = 0.00532162
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----------------     Ca = 50.5171
  uM         -------------------------------------------------------
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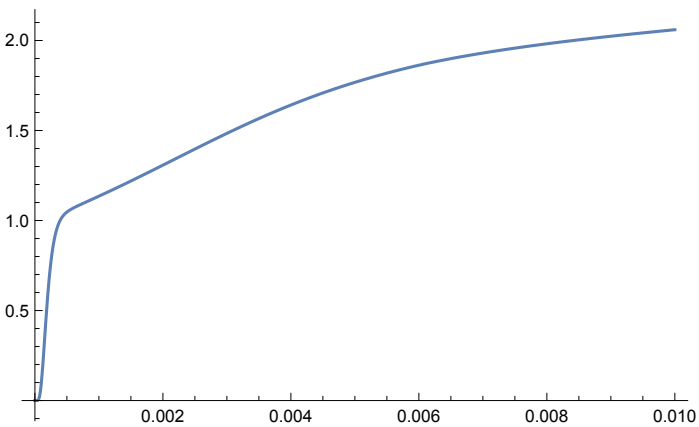

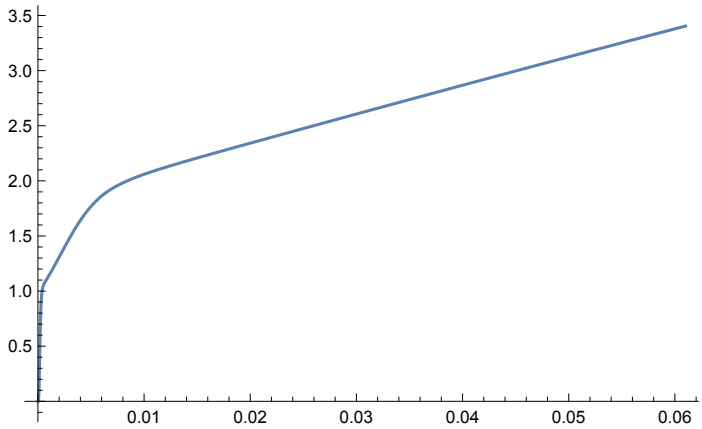

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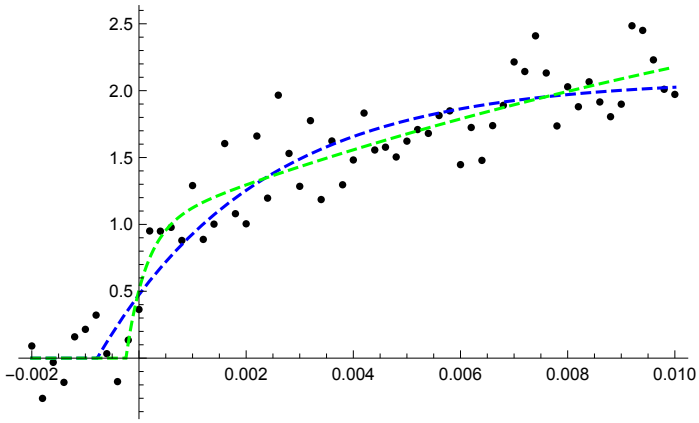


```
Mono: chi2 = 3.66734     d = 3.66734     a = 2.08386     t = 0.00301422
Bi: ratio chi2Mono/chi2Bi = 1.25126     d = -0.000242499     a =
 3.6377     a1 = 0.967128     t1 =0.000364099     t2 = 0.0169802
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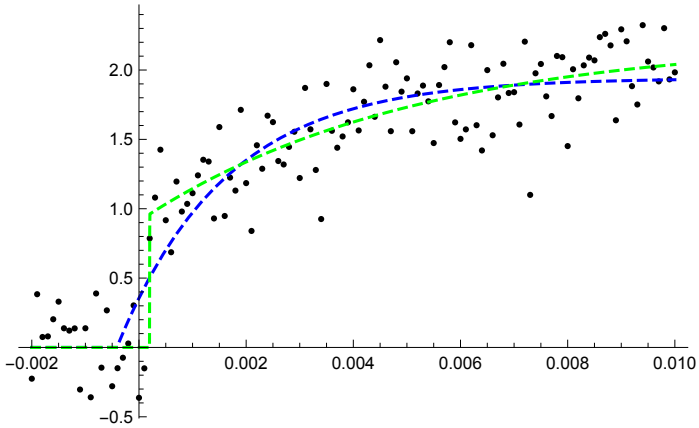

Mono: chi2 = 9.13806 d = 9.13806 a = 1.94155 t = 0.00202908

Bi: ratio chi2Mono/chi2Bi = 1.25957 d = 0.000198482 a = 2.22479 a1 = 0.961178 t1 = 8.9188×10^{-7} t2 = 0.00510124

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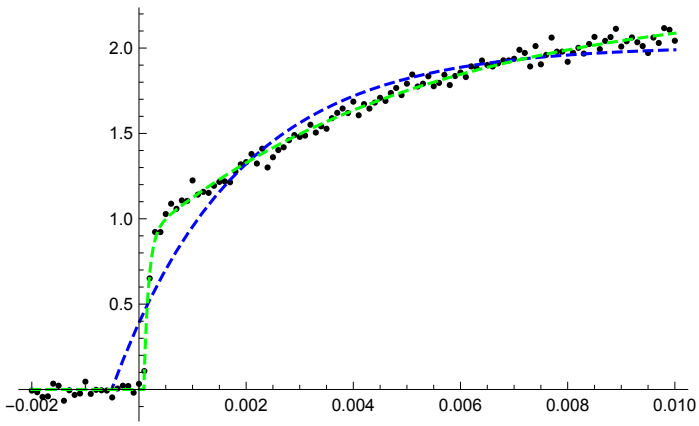

```
Mono: chi2 = 1.52065     d = 1.52065     a = 2.01249     t = 0.00234242
Bi: ratio chi2Mono/chi2Bi = 9.83027     d = 0.0000897007     a =
 2.29727     a1 = 0.901064     t1 =0.0000868529     t2 = 0.0052343
-------------------------------------------------------------------------------------
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----------------     Ca = 52.9808
  uM         -------------------------------------------------------
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```

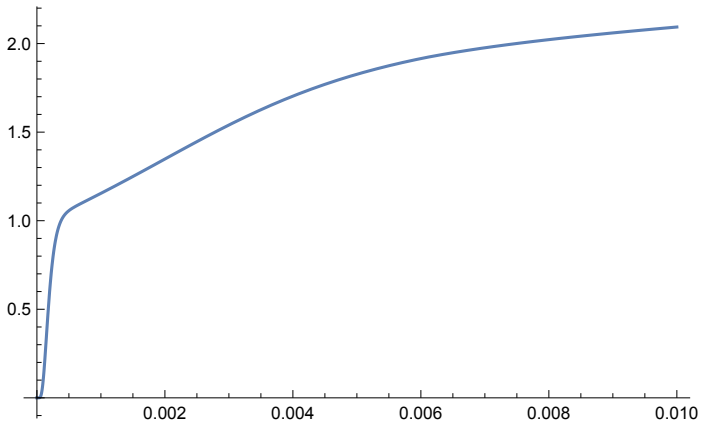

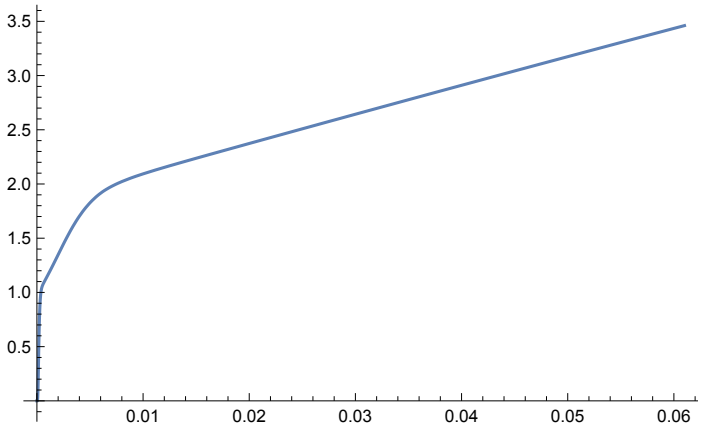


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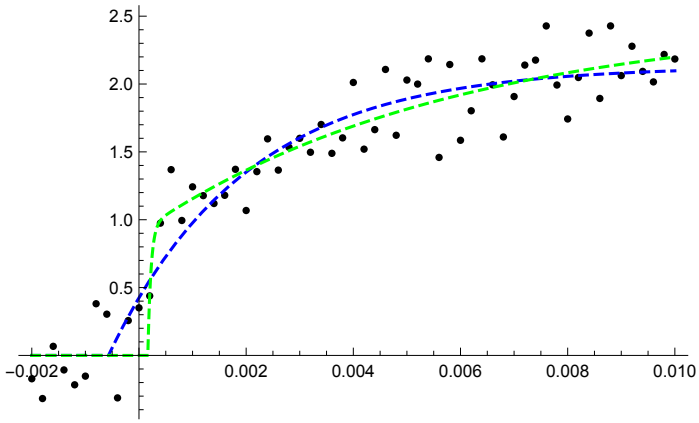


```
Mono: chi2 = 3.07316     d = 3.07316     a = 2.13122     t = 0.00255455

Bi: ratio chi2Mono/chi2Bi = 1.15366     d = 0.00016517     a =
 2.47799     a1 = 0.949828     t1 =0.000057946     t2 = 0.00578926

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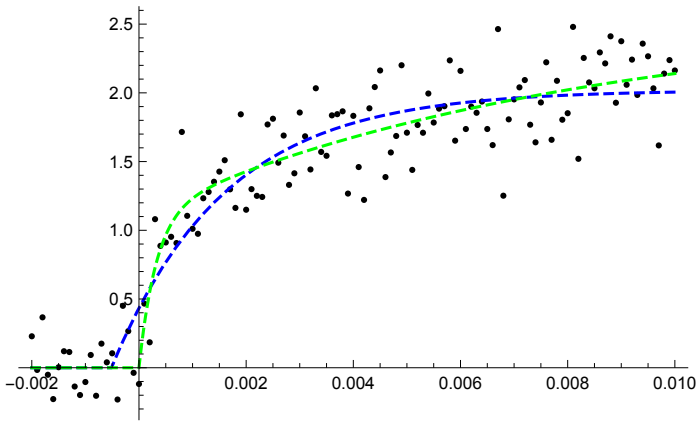

Mono: chi2 = 7.97338 d = 7.97338 a = 2.01927 t = 0.00211502

Bi: ratio chi2Mono/chi2Bi = 1.1569 d = -6.99633×10^{-17} a = 2.56306 a1 = 1.11264 t1 =0.000321097 t2 = 0.0081141

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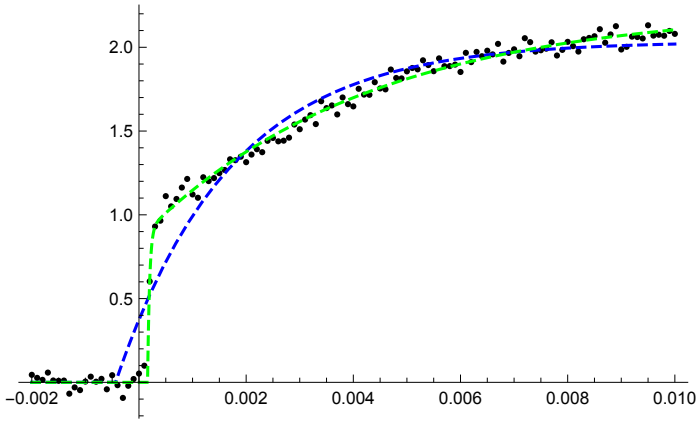


```
Mono: chi2 = 1.45981     d = 1.45981     a = 2.03496     t = 0.00214502
Bi: ratio chi2Mono/chi2Bi = 7.03674     d = 0.000160666     a =
 2.23366     a1 = 0.908709     t1 =0.0000374709     t2 = 0.00422879
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----------------     Ca = 55.5674
  uM         -------------------------------------------------------
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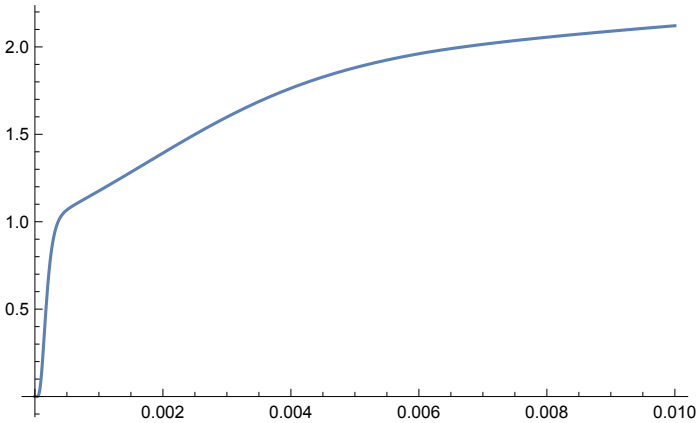

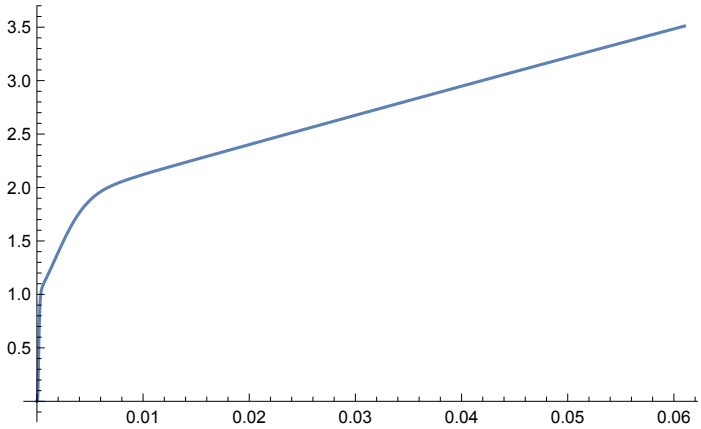

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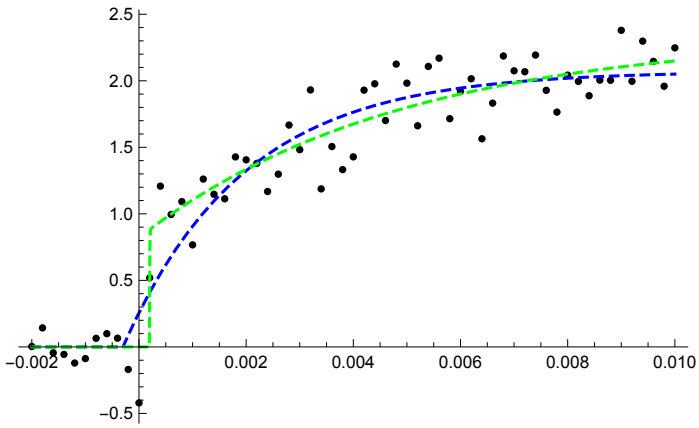

Mono: chi2 = 3.08628 d = 3.08628 a = 2.07148 t = 0.00225231

Bi: ratio chi2Mono/chi2Bi = 1.4334 d = 0.000196065 a = 2.34348 a1 = 0.881019 t1 = 4.44111×10^{-6} t2 = 0.00486101

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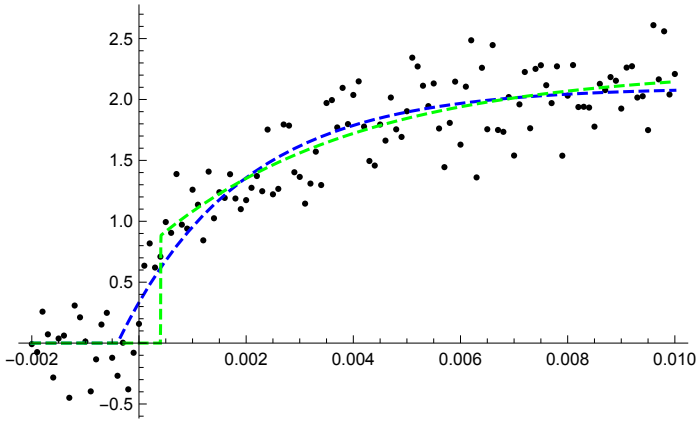

Mono: chi2 = 7.90704 d = 7.90704 a = 2.09851 t = 0.00230603

Bi: ratio chi2Mono/chi2Bi = 0.880888 d = 0.00040301 a = 2.25662 a1 = 0.882172 t1 = 1.68642×10^{-6} t2 = 0.00381425

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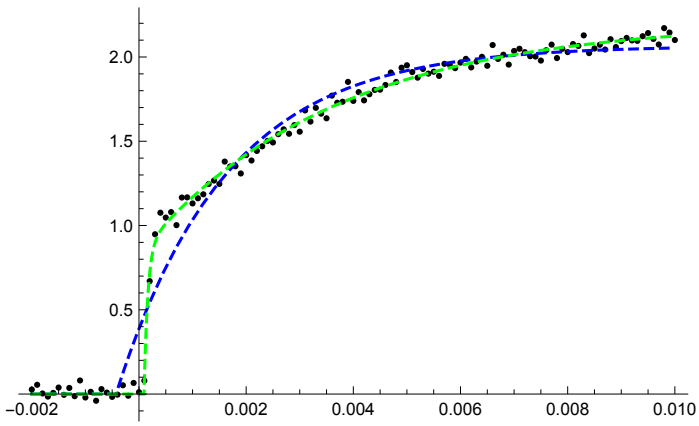

```
Mono: chi2 = 1.25244     d = 1.25244     a = 2.06631     t = 0.00205392
Bi: ratio chi2Mono/chi2Bi = 7.21874     d = 0.0000940109     a =
 2.20948     a1 = 0.871018     t1 =0.0000706703     t2 = 0.00359494
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----------------     Ca = 58.281
  uM         -------------------------------------------------------
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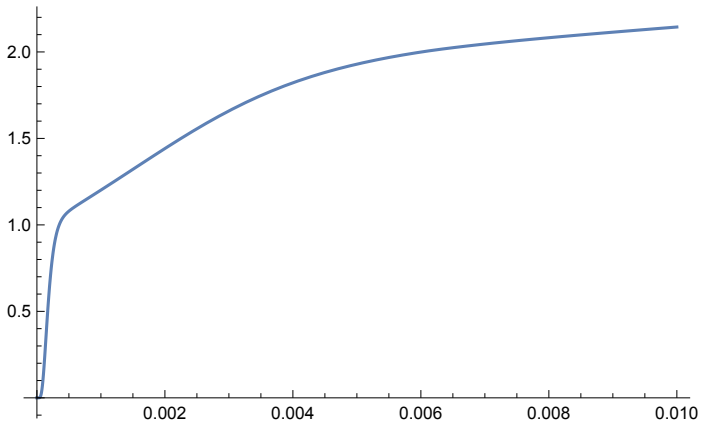

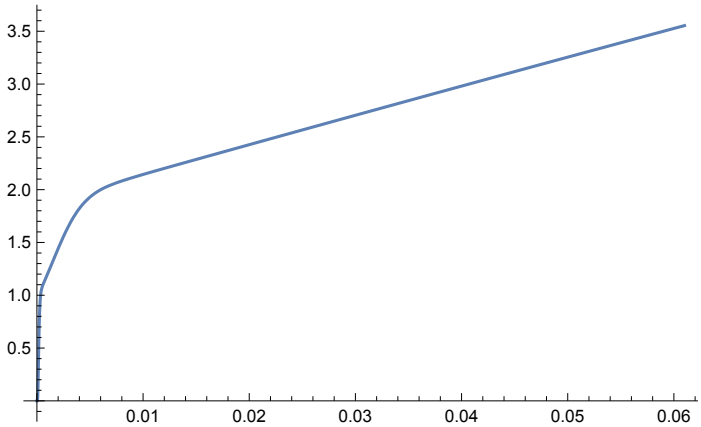


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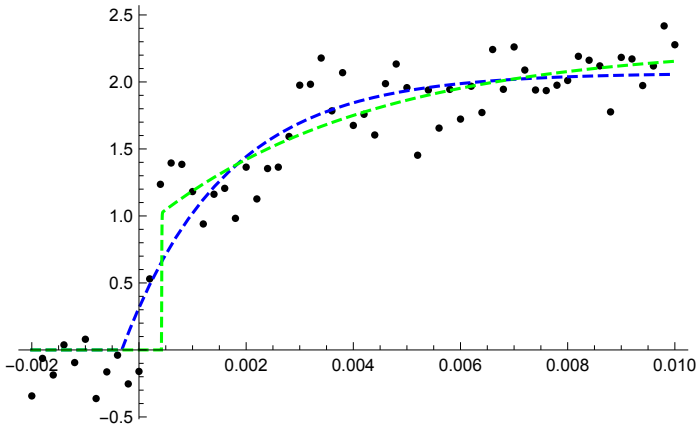

Mono: chi2 = 3.64082 d = 3.64082 a = 2.06663 t = 0.00193683

Bi: ratio chi2Mono/chi2Bi = 0.823979 d = 0.000422061 a = 2.27745 a1 = 1.02287 t1 = 3.29161×10^{-6} t2 = 0.00412463

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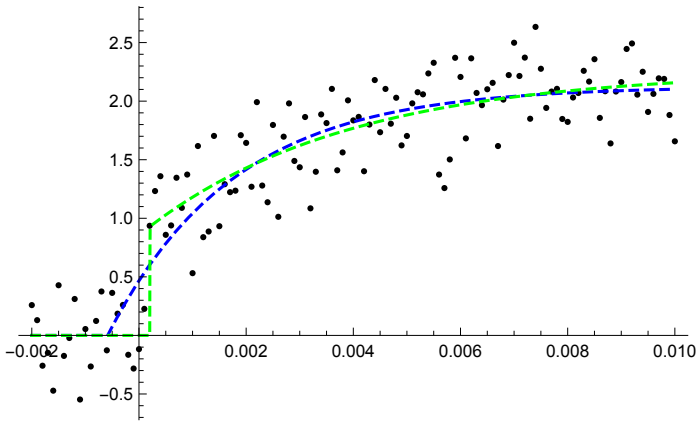

Mono: chi2 = 11.306 d = 11.306 a = 2.12515 t = 0.00234985

Bi: ratio chi2Mono/chi2Bi = 1.06152 d = 0.000202238 a = 2.25804 a1 = 0.928814 t1 = 1.56965×10^{-6} t2 = 0.00380107

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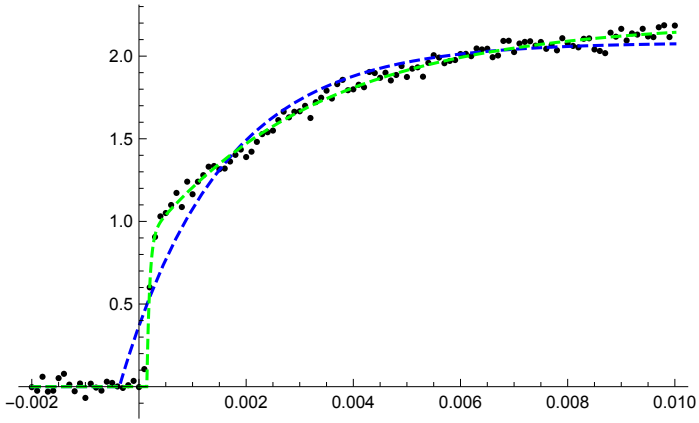


```
Mono: chi2 = 1.16922     d = 1.16922     a = 2.08263     t = 0.00187633
Bi: ratio chi2Mono/chi2Bi = 7.18576     d = 0.000146681     a =
 2.20687     a1 = 0.90582     t1 =0.0000523226     t2 = 0.00325139
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----------------     Ca = 61.1317
  uM         -------------------------------------------------------
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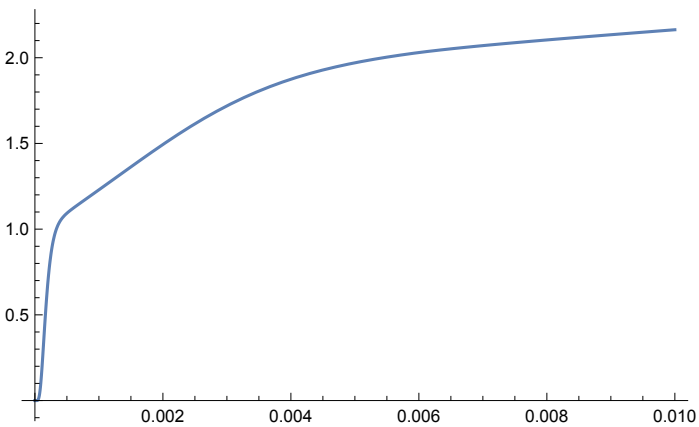

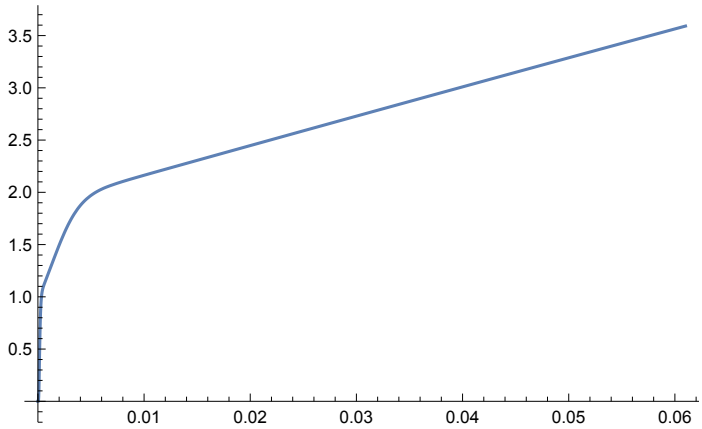

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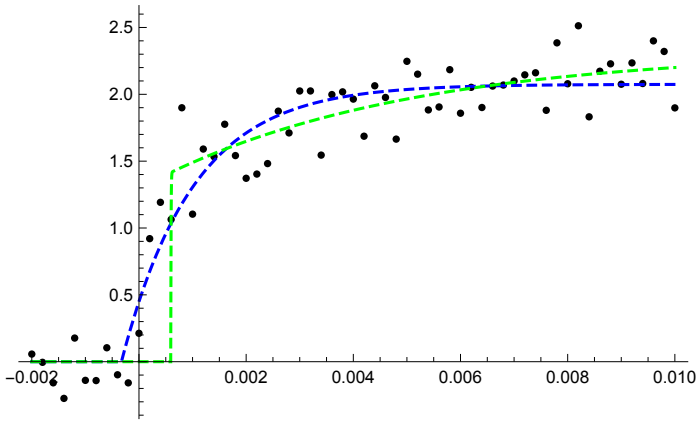

Mono: chi2 = 2.82415 d = 2.82415 a = 2.07482 t = 0.00133775

Bi: ratio chi2Mono/chi2Bi = 0.655963 d = 0.000593792 a = 2.32754 a1 = 1.41558 t1 =4.46846×10^{-6} t2 = 0.00477537

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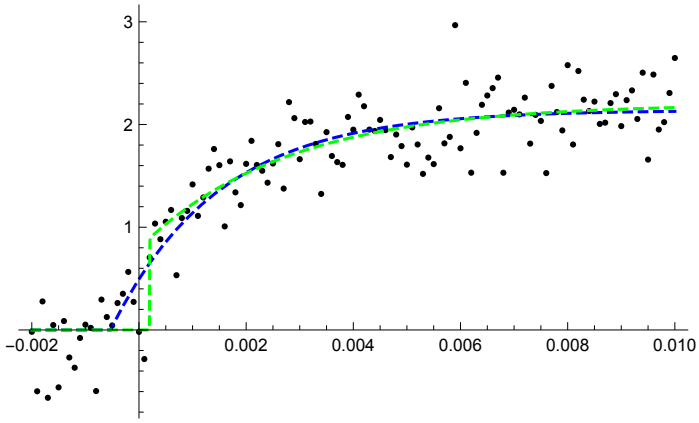

Mono: chi2 = 10.4343 d = 10.4343 a = 2.13945 t = 0.00200929

Bi: ratio chi2Mono/chi2Bi = 1.06877 d = 0.000195654 a = 2.20057 a1 = 0.891071 t1 = 2.79436×10^{-6} t2 = 0.00272197

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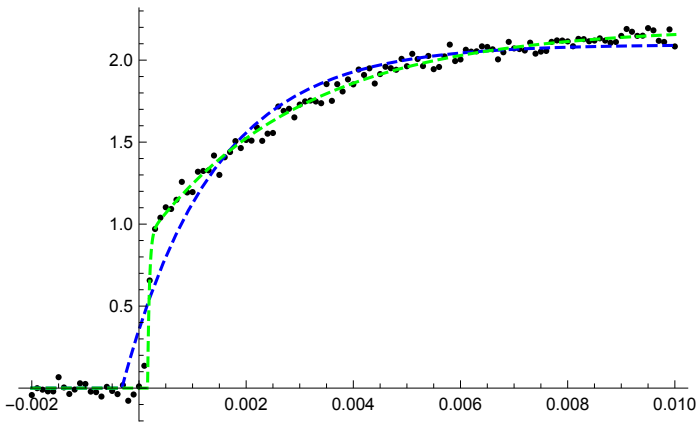

```
Mono: chi2 = 1.19449     d = 1.19449     a = 2.0947     t = 0.00170425
Bi: ratio chi2Mono/chi2Bi = 6.65499     d = 0.000160681     a =
 2.19921     a1 = 0.927017     t1 =0.0000335946     t2 = 0.00290691
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----------------     Ca = 64.1214
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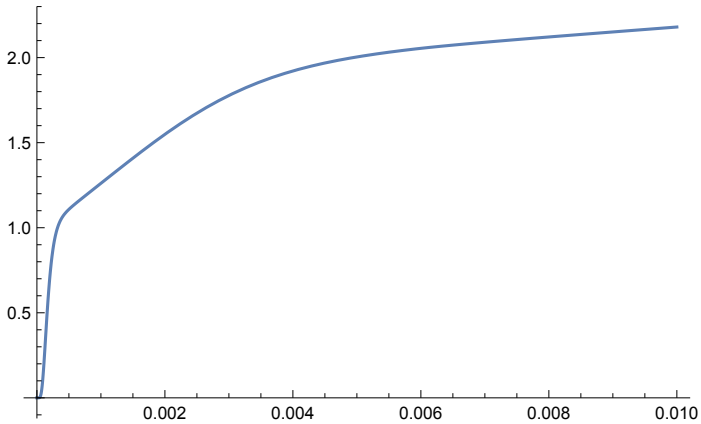

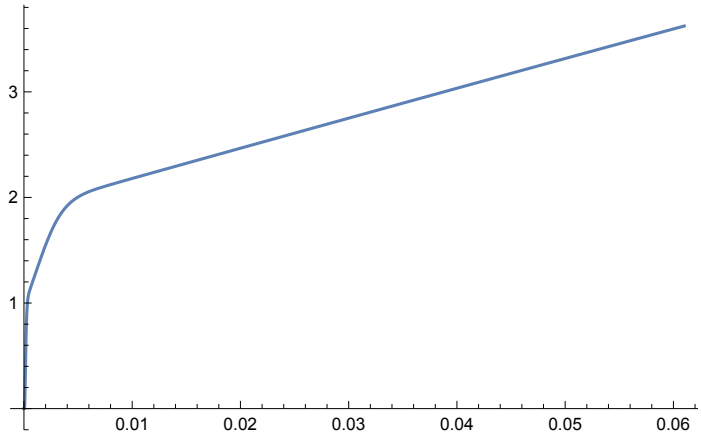


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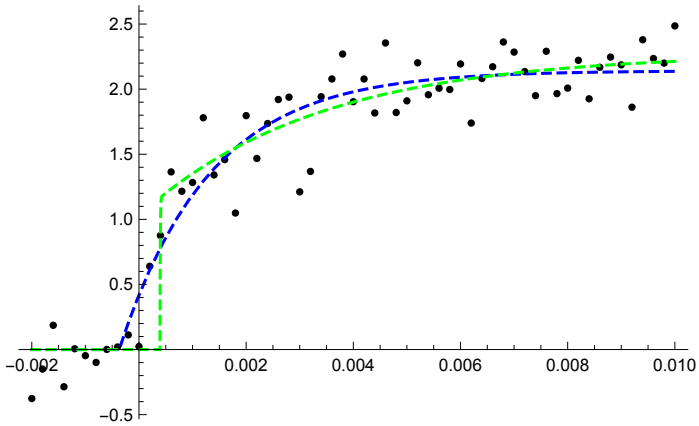

Mono: chi2 = 3.01432 d = 3.01432 a = 2.14139 t = 0.00169027

Bi: ratio chi2Mono/chi2Bi = 1.02992 d = 0.000392607 a = 2.27469 a1 = 1.1666 t1 = 5.35621×10^{-6} t2 = 0.00332081

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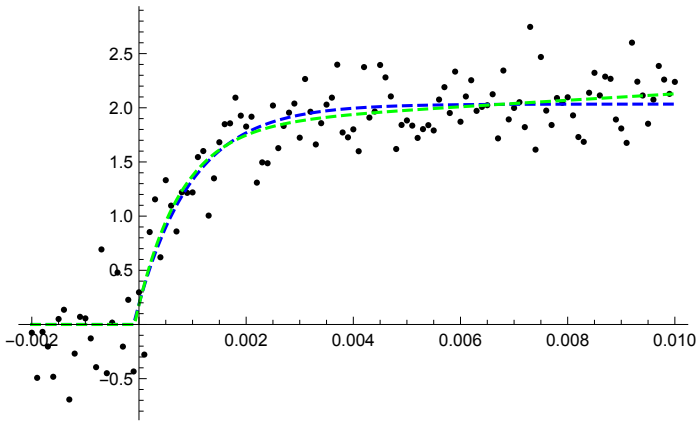


```
Mono: chi2 = 9.07094     d = 9.07094     a = 2.03397     t = 0.00103129
Bi: ratio chi2Mono/chi2Bi = 1.02402     d = -0.0000829476     a =
 10.7643     a1 = 1.82711     t1 =0.000818418     t2 = 0.293934
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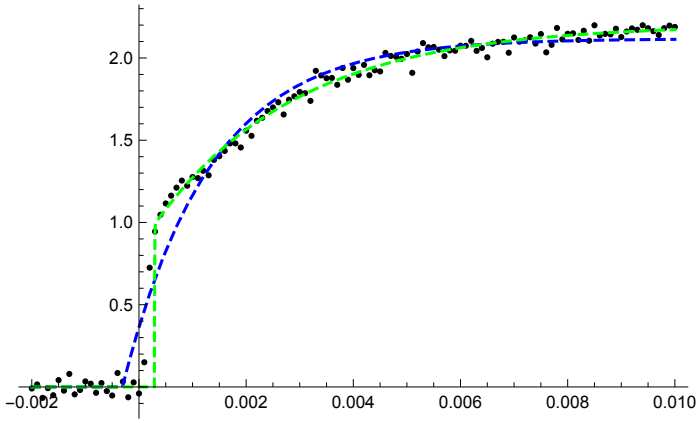

Mono: chi2 = 1.12483 d = 1.12483 a = 2.1171 t = 0.00163101

Bi: ratio chi2Mono/chi2Bi = 1.54352 d = 0.000289031 a = 2.20366 a1 = 0.98778 t1 = 3.63091×10^{-6} t2 = 0.00265478

--- Ca = 67.2653

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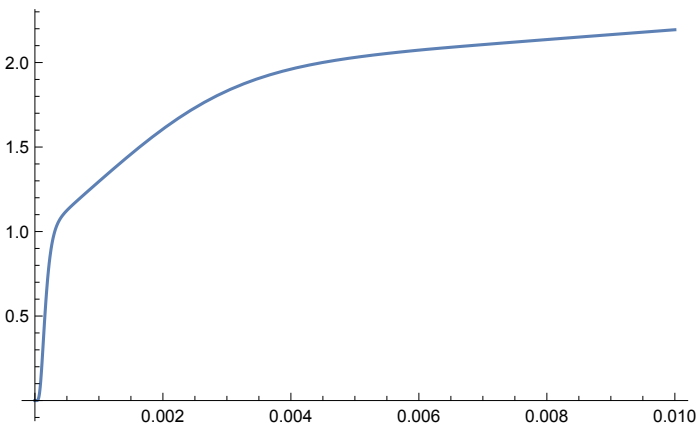

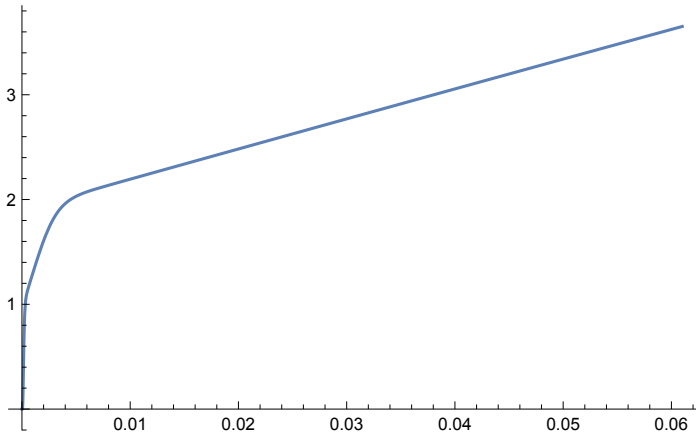

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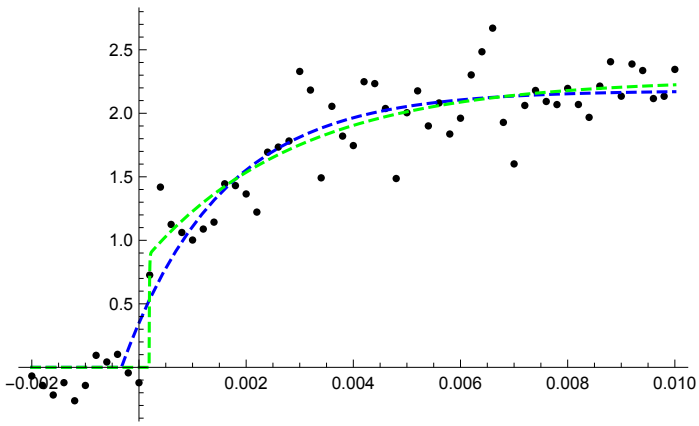

Mono: chi2 = 3.5417 d = 3.5417 a = 2.17848 t = 0.00186318

Bi: ratio chi2Mono/chi2Bi = 1.18555 d = 0.000189224 a = 2.26888 a1 = 0.887774 t1 = 6.44501×10^{-6} t2 = 0.00285972

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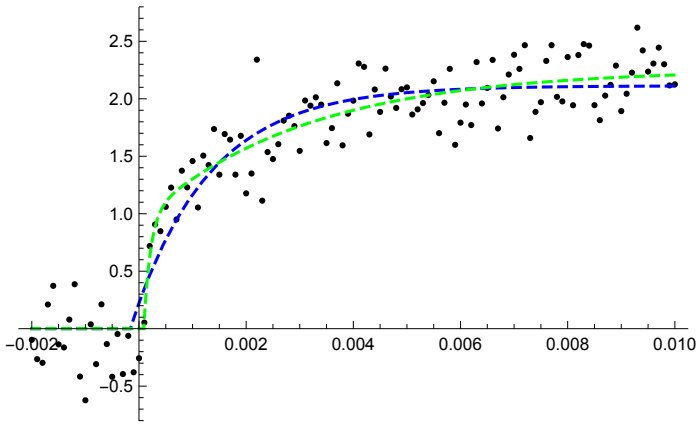


```
Mono: chi2 = 8.11627     d = 8.11627     a = 2.1125     t = 0.00144259
Bi: ratio chi2Mono/chi2Bi = 1.18454     d = 0.0000893612     a =
 2.25732     a1 = 0.97356     t1 =0.000123678     t2 = 0.00305717
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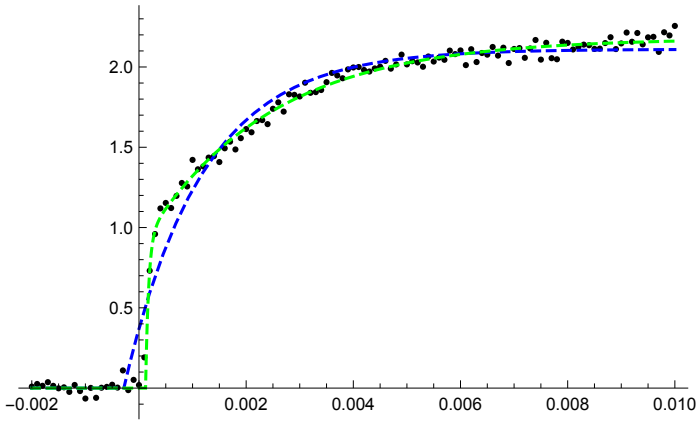
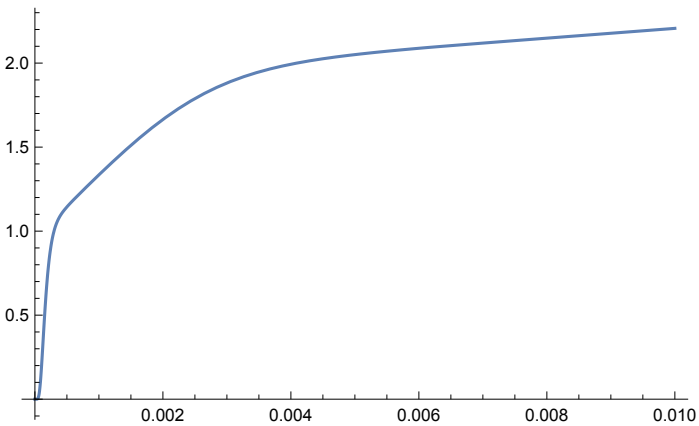


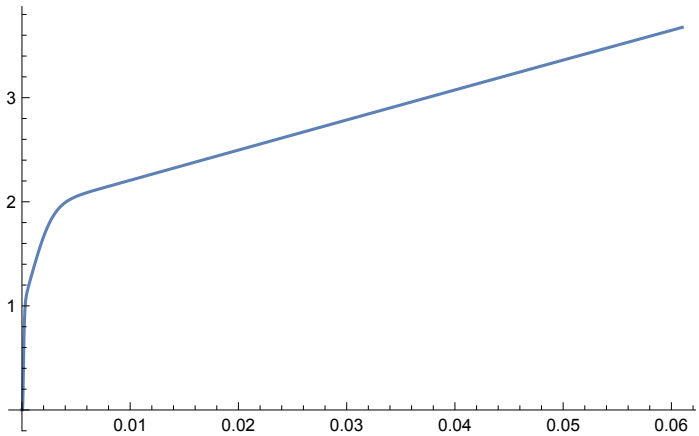
Mono: chi2 = 0.973282 d = 0.973282 a = 2.11039 t = 0.00145699

Bi: ratio chi2Mono/chi2Bi = 4.41553 d = 0.00012314 a = 2.17941 a1 = 0.932396 t1 =0.000057232 t2 = 0.00233805

--- Ca = 70.5652

uM ---





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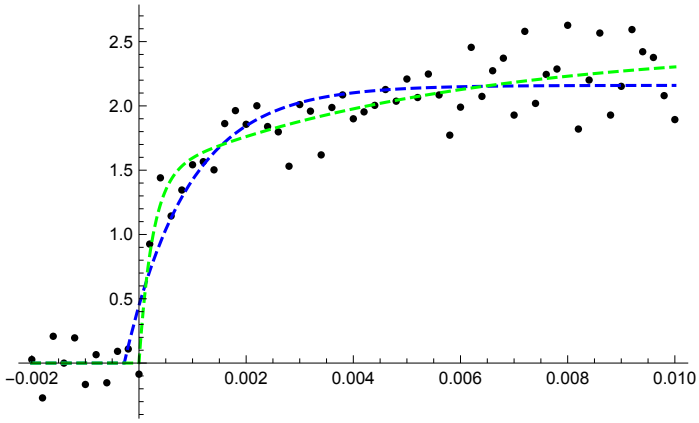

Mono: chi2 = 3.02342 d = 3.02342 a = 2.15959 t = 0.00118046

Bi: ratio chi2Mono/chi2Bi = 1.30101 d = -1.2588×10^{-18} a = 2.46815 a1 = 1.45184 t1 =0.00024857 t2 = 0.00550007

---------- C10

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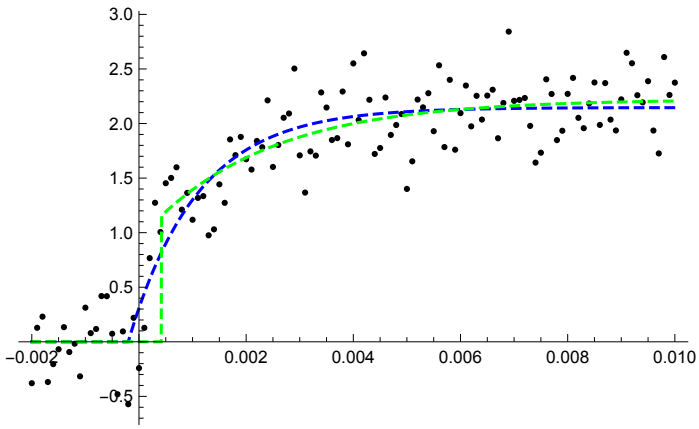

Mono: chi2 = 10.3421 d = 10.3421 a = 2.14627 t = 0.00128706

Bi: ratio chi2Mono/chi2Bi = 0.840035 d = 0.000417139 a = 2.22248 a1 = 1.15408 t1 =1.5487×10^{-6} t2 = 0.00228728

---------- D

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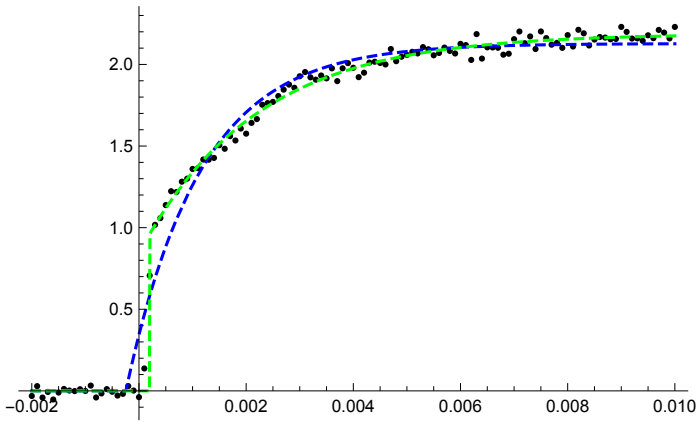
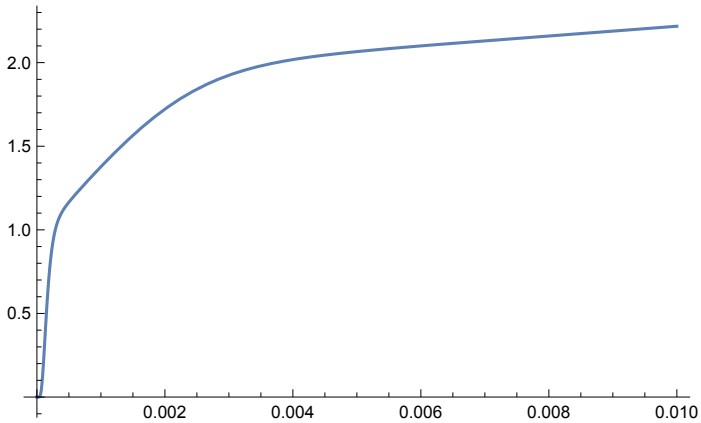
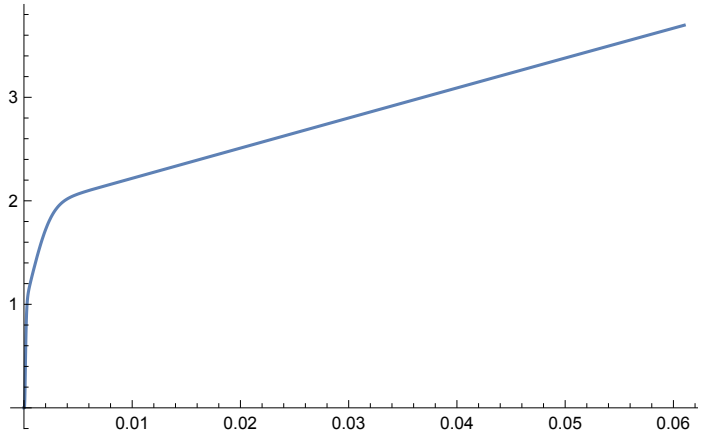


Mono: chi2 = 0.966789 d = 0.966789 a = 2.12788 t = 0.00138517

Bi: ratio chi2Mono/chi2Bi = 5.71991 d = 0.000196607 a = 2.18823 a1 = 0.958415 t1 = 2.55447×10^{-6} t2 = 0.00216514

---------- Ca = 74.0312
uM ----------





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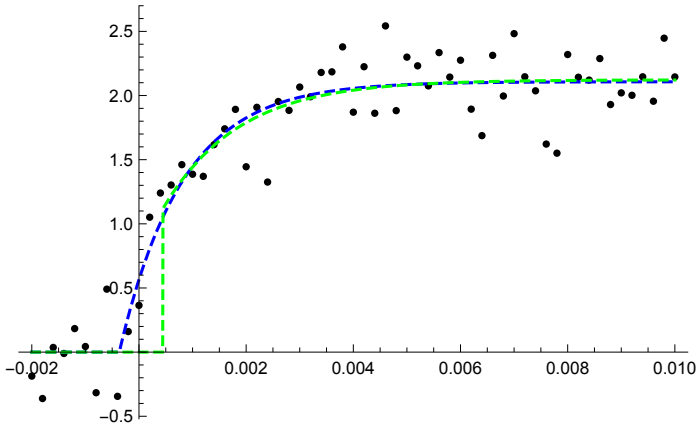

Mono: chi2 = 3.32189 d = 3.32189 a = 2.10732 t = 0.00117659

Bi: ratio chi2Mono/chi2Bi = 0.560028 d = 0.000442982 a = 2.12224 a1 = 1.11466 t1 = 1.87681×10^{-6} t2 = 0.00140739

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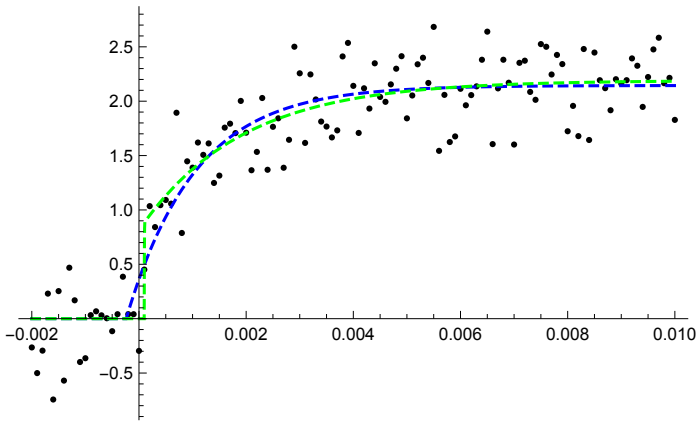

Mono: chi2 = 10.9064 d = 10.9064 a = 2.14432 t = 0.00128674

Bi: ratio chi2Mono/chi2Bi = 1.08478 d = 0.0000983562 a = 2.19054 a1 = 0.882285 t1 = 2.30171×10^{-6} t2 = 0.00190135

---------- D

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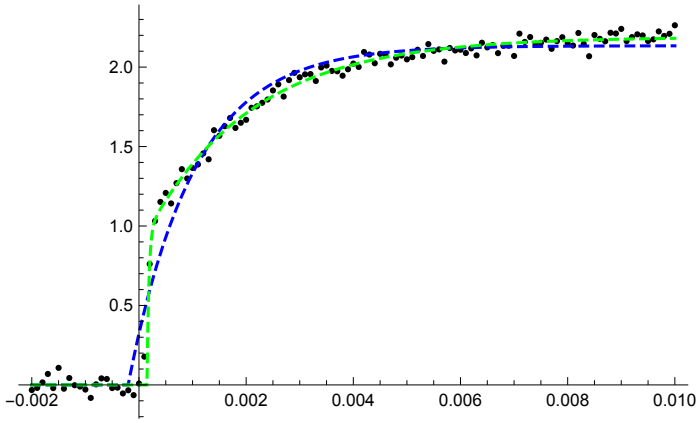



```
Mono: chi2 = 0.934552     d = 0.934552     a = 2.13437     t = 0.00122763
Bi: ratio chi2Mono/chi2Bi = 4.33713     d = 0.000149541     a =
 2.18932     a1 = 0.960689     t1 =0.0000354255     t2 = 0.00196589
```

Plots

In[407]:=
```
caFact = 1*^6;
```

In[408]:=
```
colorA = Green;
colorB = Red;
colorC = Blue;
```

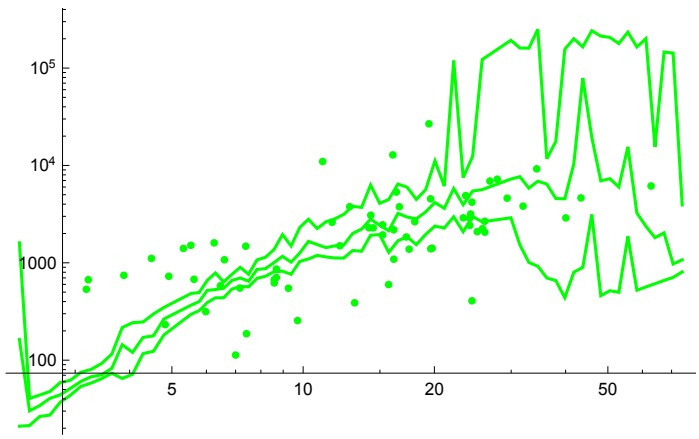
release rate 1/tau1 (merge of mono 1/tau and bi 1/tau1)

In[411]:=
```
simParam = 15;
```

C5

In[412]:=
```
gr1a = ListLogLogPlot[
   Transpose[{dataT1C5Ca, dataT1C5RelRate}], PlotStyle → {colorA}];
gr2a = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamMedianC5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
gr3a = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile1C5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
gr4a = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile2C5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
Show[gr1a, gr2a, gr3a, gr4a, PlotRange → All ]
If[exportYes == 1,
  Export["plot InvTau1 C5 data.txt",
   Transpose[{dataT1C5Ca, dataT1C5RelRate}], "Table"];
  toExport = Transpose[{caFact simCaList, simParamQuantile1C5[[simParam, All]],
      simParamMedianC5[[simParam, All]], simParamQuantile2C5[[simParam, All]]}];
  Export["plot InvTau1 C5 fit - quantiles and median.txt", toExport, "Table"];
 ];
```

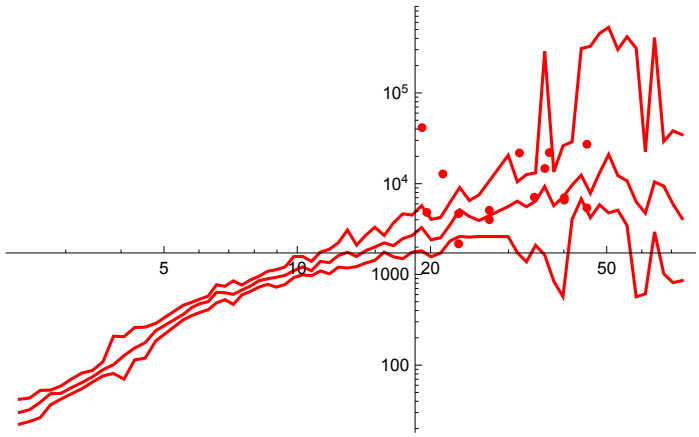
Out[416]=



C10

In[418]:=
```
gr1b = ListLogLogPlot[
   Transpose[{dataT1C10Ca, dataT1C10RelRate}], PlotStyle → {colorB}];
gr2b = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamMedianC10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
gr3b = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile1C10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
gr4b = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile2C10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
Show[gr1b, gr2b, gr3b, gr4b, PlotRange → All ]
If[exportYes == 1,
  Export["plot InvTau1 C10 data.txt",
   Transpose[{dataT1C10Ca, dataT1C10RelRate}], "Table"];
  toExport = Transpose[{caFact simCaList, simParamQuantile1C10[[simParam, All]],
      simParamMedianC10[[simParam, All]],
      simParamQuantile2C10[[simParam, All]]}];
  Export["plot InvTau1 C10 fit - quantiles and median.txt", toExport, "Table"];
 ];
```

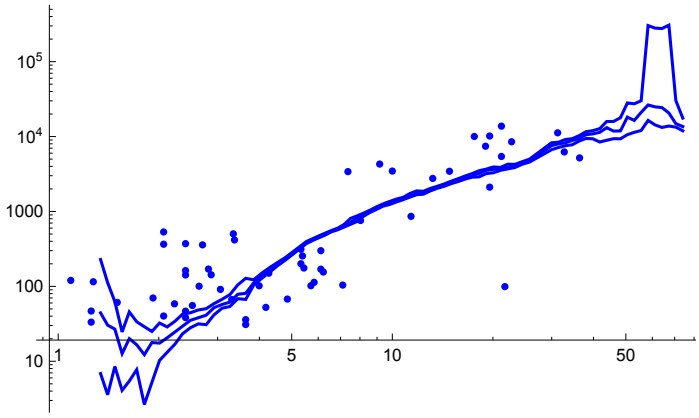
Out[422]=



D

In[424]:=
```
gr1c =
  ListLogLogPlot[Transpose[{dataT1DCa, dataT1DRelRate}], PlotStyle → {colorC}];
gr2c = ListLogLogPlot[Transpose[
    {caFact simCaList, simParamMedianD[[simParam, All]]}],
   PlotStyle → { colorC}, Joined → True, PlotRange → All];
gr3c = ListLogLogPlot[Transpose[{caFact simCaList,
     simParamQuantile1D[[simParam, All]]}],
   PlotStyle → { colorC}, Joined → True, PlotRange → All];
gr4c = ListLogLogPlot[Transpose[{caFact simCaList,
     simParamQuantile2D[[simParam, All]]}],
   PlotStyle → { colorC}, Joined → True, PlotRange → All];
Show[gr1c, gr2c, gr3c, gr4c, PlotRange → All ]
If[exportYes == 1,
  Export["plot InvTau1 D data.txt",
   Transpose[{dataT1DCa, dataT1DRelRate}], "Table"];
  toExport = Transpose[{caFact simCaList, simParamQuantile1D[[simParam, All]],
     simParamMedianD[[simParam, All]], simParamQuantile2D[[simParam, All]]}];
  Export["plot InvTau1 D fit - quantiles and median.txt", toExport, "Table"];
 ];
```

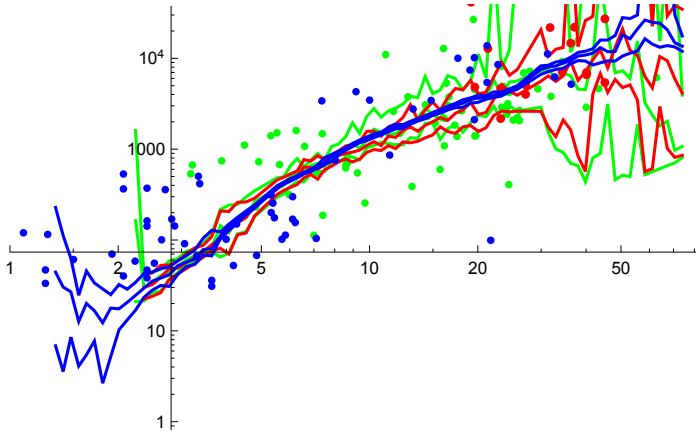
Out[428]=



C5 and C10 and D

In[430]:=
```
Show[gr1a, gr2a, gr3a, gr4a, gr1b, gr2b, gr3b,
 gr4b, gr1c, gr2c, gr3c, gr4c, PlotRange → {All, {0, 10}}]
```

Out[430]=



In[431]:=
```
Show[gr1a, gr1b, gr1c, PlotRange → {All, {2, 10}}];
```

delay (mono and bi merged)

In[432]:=
```
simParam = 12;
```

In[433]:=
```
Transpose[{caFact simCaList, simParamMedianC5[[simParam, All]]}] // TableForm
```

Out[433]//TableForm=

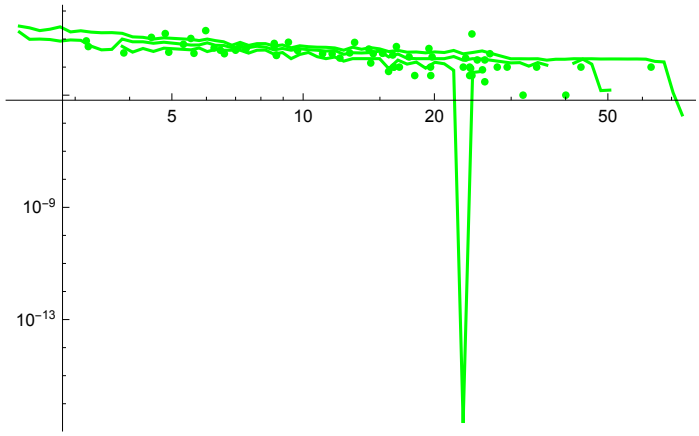
0.703073	
0.729825	
0.758204	
0.788054	
0.820427	
0.854404	
0.890526	
0.928936	
0.968962	
1.01226	
1.05883	
1.10833	
1.16077	
1.21664	
1.27589	
1.33895	
1.40597	
1.47745	
1.55324	
1.63202	
1.71772	
1.81058	
1.90732	
2.01009	
2.11924	
2.23489	0.00177785
2.35773	0.000979399
2.48791	0.001
2.62605	0.000960739
2.77177	0.000844267
2.92648	0.000930554

3.0905	0.000900179
3.26357	0.000558785
3.44741	0.000411968
3.64088	0.000428604
3.84593	0.001
4.06272	0.0008
4.29254	0.0008
4.53549	0.000707653
4.79194	0.000772361
5.53376	0.000610771
5.7741	0.000615847
6.02652	0.000734045
6.29189	0.0006
6.57096	0.000591279
6.86435	0.000493427
7.17282	0.000528947
7.4968	0.000494507
7.83735	0.000553475
8.19526	0.000514927
8.57176	0.000411934
8.96782	0.000462257
9.38444	0.0004
9.82288	0.000453358
10.2842	0.000417232
10.77	0.0004
11.2815	0.00037253
11.8202	0.000391407
12.3876	0.000286653
12.9855	0.000324817
13.6155	0.000318934
14.2795	0.000329824
14.9795	0.000372908
15.7174	0.000229491
16.4957	0.000293767
17.3163	0.000206355
18.1821	0.0002
19.0955	0.0002
20.0596	0.0002
21.0761	0.0002
22.1498	0.000238411
23.2819	0.000176483
24.4782	0.0002
25.7412	0.000193641
29.9583	0.000141104
31.4124	0.000144304
32.938	0.000108196
34.5385	0.0001452
36.2174	0.000117577
37.9787	-0.0000173755
39.8264	-0.0000332077
41.7651	0.000138059
43.7978	0.000192267
45.9306	0.000127561
48.1689	0.000014571
50.5171	0.0000151274
52.9808	-8.67808×10^{-6}
55.5674	0.0000823496
58.281	-4.06151×10^{-6}
61.1317	-0.0000693773
64.1214	-0.0002
67.2653	-0.0000137693
70.5652	-0.0000661687
74.0312	-0.000125759

C5

In[434]:=
```
gr1a =
  ListLogLogPlot[Transpose[{dataT1C5Ca, dataT1C5Delay}], PlotStyle → {colorA}];
gr2a = ListLogLogPlot[Transpose[
    {caFact simCaList, simParamMedianC5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
gr3a = ListLogLogPlot[Transpose[{caFact simCaList,
     simParamQuantile1C5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
gr4a = ListLogLogPlot[Transpose[{caFact simCaList,
     simParamQuantile2C5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
Show[gr1a, gr2a, gr3a, gr4a, PlotRange → All ]
If[exportYes == 1,
  Export["plot delay C5 data.txt",
   Transpose[{dataT1C5Ca, dataT1C5Delay}], "Table"];
  toExport = Transpose[{caFact simCaList, simParamQuantile1C5[[simParam, All]],
     simParamMedianC5[[simParam, All]], simParamQuantile2C5[[simParam, All]]}];
  Export["plot delay C5 fit - quantiles and median.txt", toExport, "Table"];
 ];
```

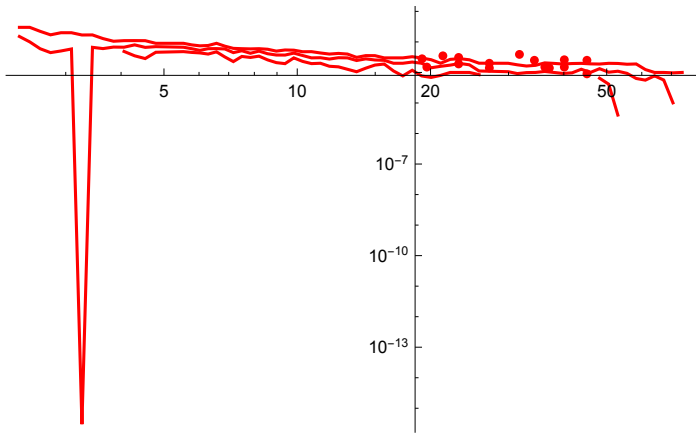
Out[438]=



C10

In[440]:=
```
gr1b = ListLogLogPlot[
   Transpose[{dataT1C10Ca, dataT1C10Delay}], PlotStyle → {colorB}];
gr2b = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamMedianC10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
gr3b = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile1C10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
gr4b = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile2C10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
Show[gr1b, gr2b, gr3b, gr4b, PlotRange → All ]
If[exportYes == 1,
  Export["plot delay C10 data.txt",
   Transpose[{dataT1C10Ca, dataT1C10Delay}], "Table"];
  toExport = Transpose[{caFact simCaList, simParamQuantile1C10[[simParam, All]],
      simParamMedianC10[[simParam, All]],
      simParamQuantile2C10[[simParam, All]]}];
  Export["plot delay C10 fit - quantiles and median.txt", toExport, "Table"];
 ];
```

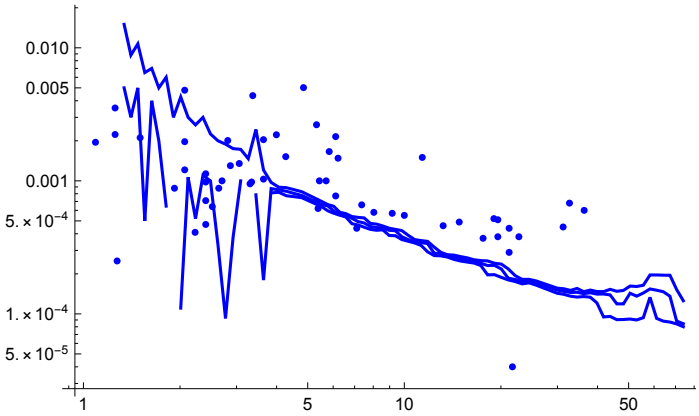
Out[444]=



D

In[446]:=
```
gr1c =
  ListLogLogPlot[Transpose[{dataT1DCa, dataT1DDelay}], PlotStyle → {colorC}];
gr2c = ListLogLogPlot[Transpose[
    {caFact simCaList, simParamMedianD[[simParam, All]]}],
   PlotStyle → { colorC}, Joined → True, PlotRange → All];
gr3c = ListLogLogPlot[Transpose[{caFact simCaList,
     simParamQuantile1D[[simParam, All]]}],
   PlotStyle → { colorC}, Joined → True, PlotRange → All];
gr4c = ListLogLogPlot[Transpose[{caFact simCaList,
     simParamQuantile2D[[simParam, All]]}],
   PlotStyle → { colorC}, Joined → True, PlotRange → All];
Show[gr1c, gr2c, gr3c, gr4c, PlotRange → All ]
If[exportYes == 1,
  Export["plot delay D data.txt",
   Transpose[{dataT1DCa, dataT1DDelay}], "Table"];
  toExport = Transpose[{caFact simCaList, simParamQuantile1D[[simParam, All]],
     simParamMedianD[[simParam, All]], simParamQuantile2D[[simParam, All]]}];
  Export["plot delay D fit - quantiles and median.txt", toExport, "Table"];
 ];
```

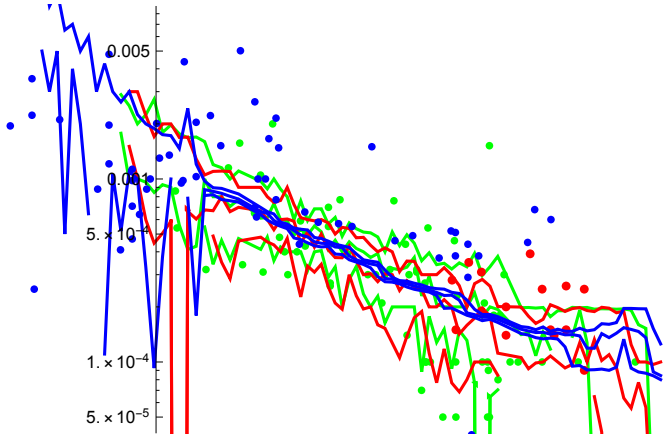
Out[450]=



C5 and C10 and D

In[452]:=
```
Show[gr1a, gr2a, gr3a, gr4a, gr1b, gr2b, gr3b,
 gr4b, gr1c, gr2c, gr3c, gr4c, PlotRange → {-10, -5}]
```

Out[452]=



In[453]:=
```
Show[gr1a, gr1b, gr1c, PlotRange → All];
```

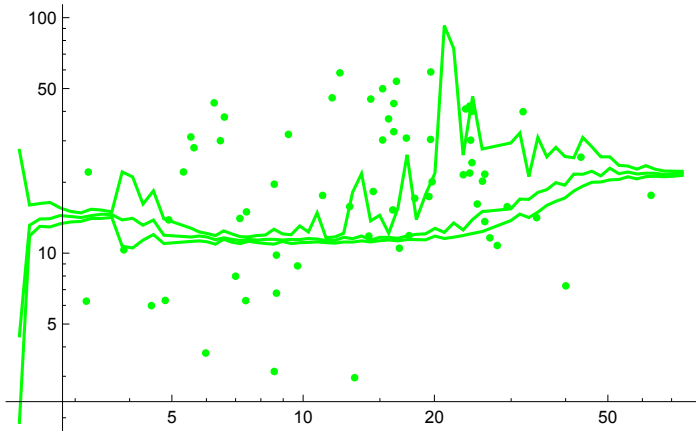
amp (merge of mono amp and bi amp)

In[454]:=
```
simParam = 13;
```

C5

In[455]:=
```
gr1a = ListLogLogPlot[
   Transpose[{dataT1C5Ca, dataT1C5Amplitude}], PlotStyle → {colorA}];
gr2a = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamMedianC5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
gr3a = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamQuantile1C5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
gr4a = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamQuantile2C5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
Show[gr1a, gr2a, gr3a, gr4a, PlotRange → All ]
```

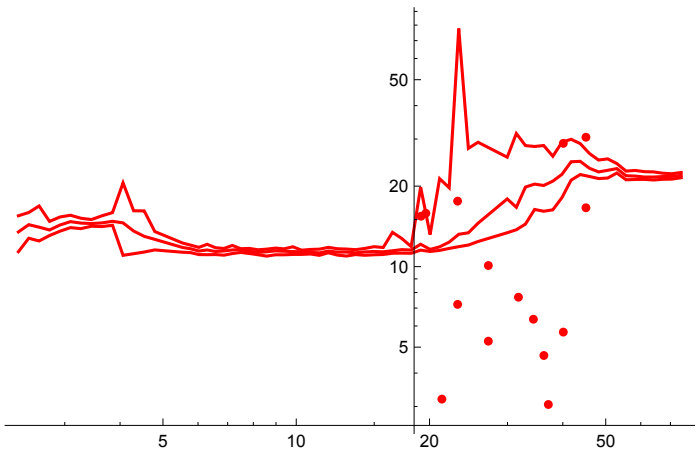
Out[459]=



C10

In[460]:=
```
gr1b = ListLogLogPlot[
   Transpose[{dataT1C10Ca, dataT1C10Amplitude}], PlotStyle → {colorB}];
gr2b = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamMedianC10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
gr3b = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamQuantile1C10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
gr4b = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamQuantile2C10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
Show[gr1b, gr2b, gr3b, gr4b, PlotRange → All ]
```

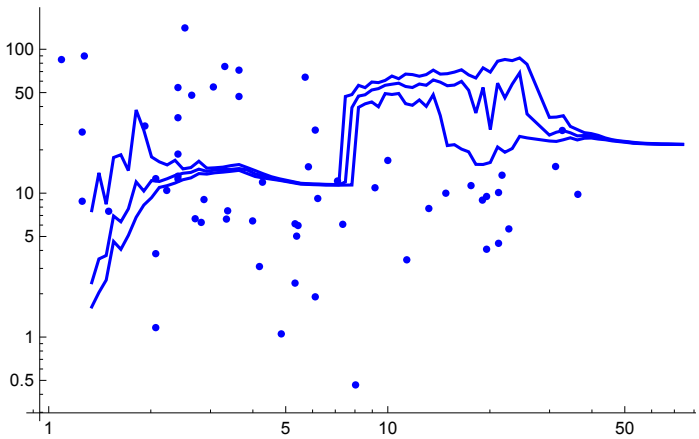
Out[464]=



D

In[465]:=
```
gr1c = ListLogLogPlot[
   Transpose[{dataT1DCa, dataT1DAmplitude}], PlotStyle → {colorC}];
gr2c = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamMedianD[[simParam, All]]}],
   PlotStyle → { colorC}, Joined → True, PlotRange → All];
gr3c = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamQuantile1D[[simParam, All]]}],
   PlotStyle → { colorC}, Joined → True, PlotRange → All];
gr4c = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamQuantile2D[[simParam, All]]}],
   PlotStyle → { colorC}, Joined → True, PlotRange → All];
Show[gr1c, gr2c, gr3c, gr4c, PlotRange → All ]
```

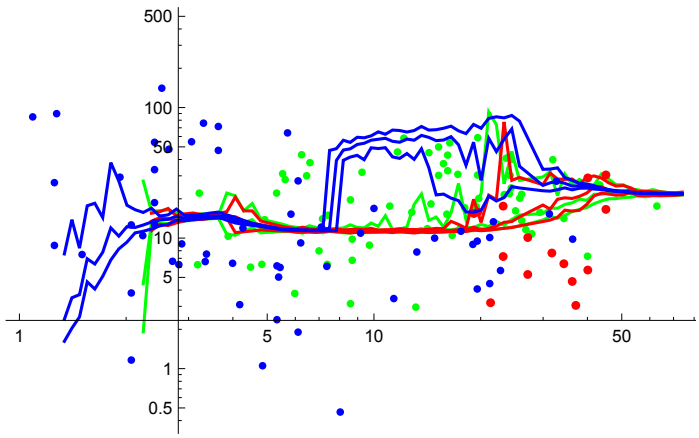
Out[469]=



C5 and C10 and D

In[470]:=
```
Show[gr1a, gr2a, gr3a, gr4a, gr1b, gr2b, gr3b,
 gr4b, gr1c, gr2c, gr3c, gr4c, PlotRange → {-1, 6} ]
```

Out[470]=



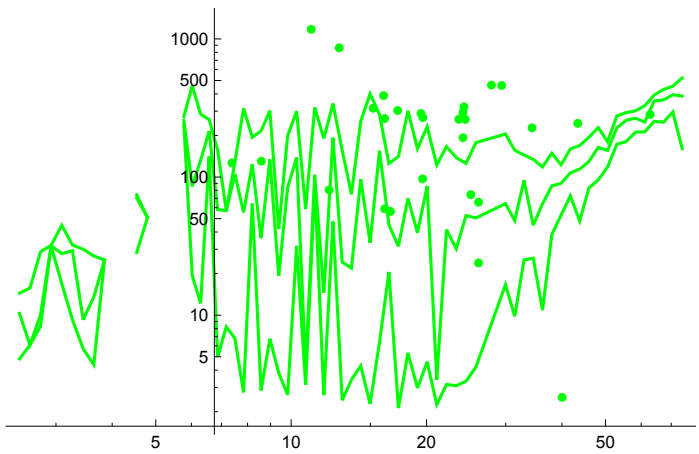
release rate 1/tau2 of bi fits (if bi is justified)

In[471]:=
```
simParam = 16;
```

C5

In[472]:=
```
gr1a = ListLogLogPlot[
   Transpose[{dataT2C5Ca, dataT2C5RelRate}], PlotStyle → {colorA}];
gr2a = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamMedianC5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
gr3a = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile1C5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
gr4a = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile2C5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
Show[gr1a, gr2a, gr3a, gr4a, PlotRange → All ]
If[exportYes == 1,
  Export["plot InvTau2 C5 data.txt",
   Transpose[{dataT2C5Ca, dataT2C5RelRate}], "Table"];
  toExport = Transpose[{caFact simCaList, simParamQuantile1C5[[simParam, All]],
      simParamMedianC5[[simParam, All]], simParamQuantile2C5[[simParam, All]]}];
  Export["plot InvTau2 C5 fit - quantiles and median.txt", toExport, "Table"];
 ];
```

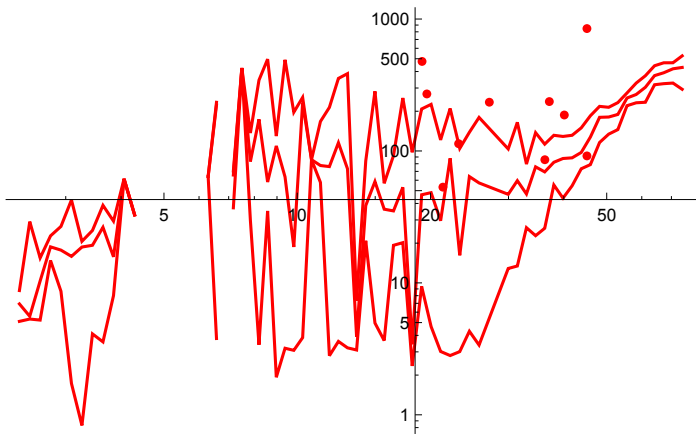
Out[476]=



C10

In[478]:=
```
gr1b = ListLogLogPlot[
   Transpose[{dataT2C10Ca, dataT2C10RelRate}], PlotStyle → {colorB}];
gr2b = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamMedianC10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
gr3b = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile1C10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
gr4b = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile2C10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
Show[gr1b, gr2b, gr3b, gr4b, PlotRange → All ]
If[exportYes == 1,
  Export["plot InvTau2 C10 data.txt",
   Transpose[{dataT2C10Ca, dataT2C10RelRate}], "Table"];
  toExport = Transpose[{caFact simCaList, simParamQuantile1C10[[simParam, All]],
      simParamMedianC10[[simParam, All]],
      simParamQuantile2C10[[simParam, All]]}];
  Export["plot InvTau2 C10 fit - quantiles and median.txt", toExport, "Table"];
 ];
```

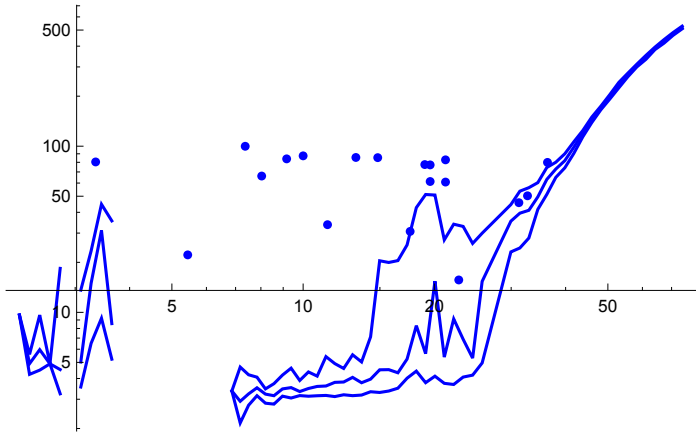
Out[482]=



D

In[484]:=
```
gr1c =
  ListLogLogPlot[Transpose[{dataT2DCa, dataT2DRelRate}], PlotStyle → {colorC}];
gr2c = ListLogLogPlot[Transpose[
    {caFact simCaList, simParamMedianD[[simParam, All]]}],
   PlotStyle → { colorC}, Joined → True, PlotRange → All];
gr3c = ListLogLogPlot[Transpose[{caFact simCaList,
     simParamQuantile1D[[simParam, All]]}],
   PlotStyle → { colorC}, Joined → True, PlotRange → All];
gr4c = ListLogLogPlot[Transpose[{caFact simCaList,
     simParamQuantile2D[[simParam, All]]}],
   PlotStyle → { colorC}, Joined → True, PlotRange → All];
Show[gr1c, gr2c, gr3c, gr4c, PlotRange → All ]
If[exportYes == 1,
  Export["plot InvTau2 D data.txt",
   Transpose[{dataT2DCa, dataT2DRelRate}], "Table"];
  toExport = Transpose[{caFact simCaList, simParamQuantile1D[[simParam, All]],
     simParamMedianD[[simParam, All]], simParamQuantile2D[[simParam, All]]}];
  Export["plot InvTau2 D fit - quantiles and median.txt", toExport, "Table"];
 ];
```

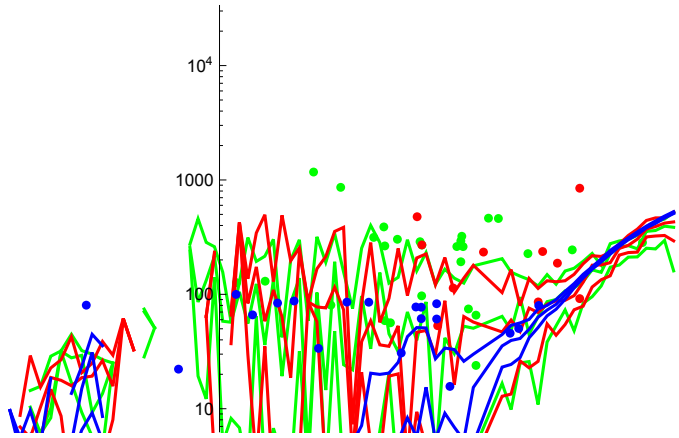
Out[488]=



C5 and C10 and D

In[490]:=
```
Show[gr1a, gr2a, gr3a, gr4a, gr1b, gr2b, gr3b,
 gr4b, gr1c, gr2c, gr3c, gr4c, PlotRange → {All, {2, 10}}]
```

Out[490]=



In[491]:=
```
Show[gr1a, gr1b, gr1c, PlotRange → All];
```

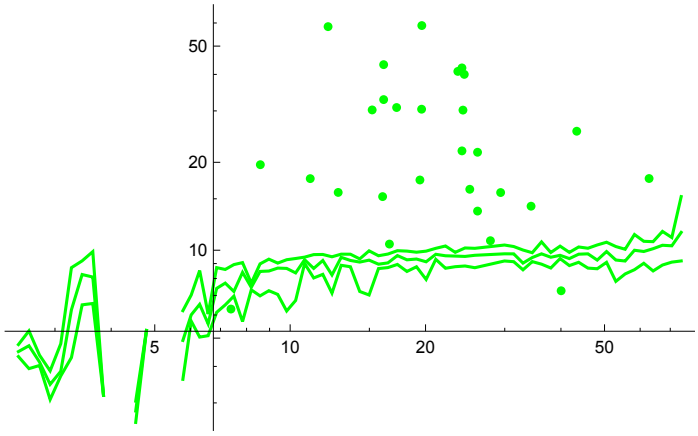
amp1 of bi fits (if bi is justified)

In[492]:=
```
simParam = 14;
```

C5

In[493]:=
```
gr1a = ListLogLogPlot[
   Transpose[{dataT2C5Ca, dataT2C5Amplitude1}], PlotStyle → {colorA}];
gr2a = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamMedianC5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
gr3a = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamQuantile1C5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
gr4a = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamQuantile2C5[[simParam, All]]}],
   PlotStyle → { colorA}, Joined → True, PlotRange → All];
Show[gr1a, gr2a, gr3a, gr4a, PlotRange → All ]
```

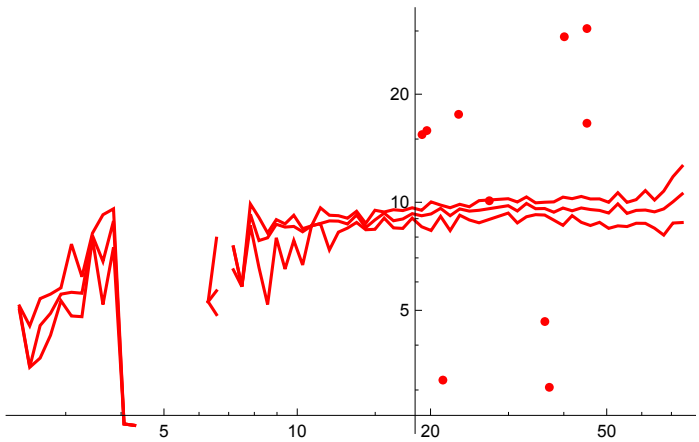
Out[497]=



C10

In[498]:=
```
gr1b = ListLogLogPlot[
   Transpose[{dataT2C10Ca, dataT2C10Amplitude1}], PlotStyle → {colorB}];
gr2b = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamMedianC10[[simParam, All]]}],
   PlotStyle → { colorB}, Joined → True, PlotRange → All];
gr3b = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamQuantile1C10[[simParam, All]]}],
   PlotStyle → {colorB}, Joined → True, PlotRange → All];
gr4b = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamQuantile2C10[[simParam, All]]}],
   PlotStyle → {colorB}, Joined → True, PlotRange → All];
Show[gr1b, gr2b, gr3b, gr4b, PlotRange → All ]
```

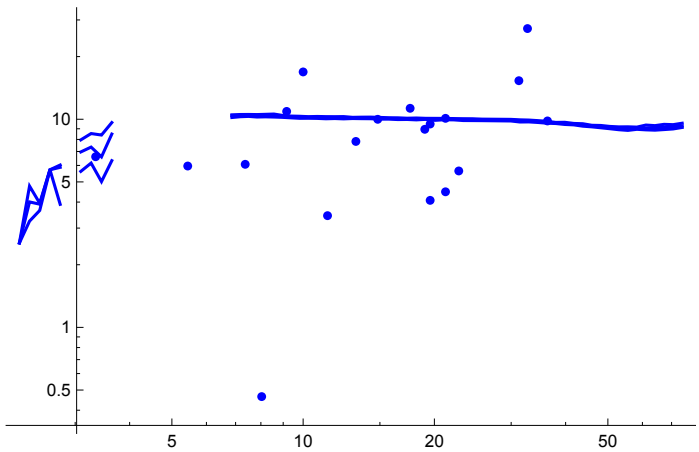
Out[502]=



D

In[503]:=
```
gr1c = ListLogLogPlot[
   Transpose[{dataT2DCa, dataT2DAmplitude1}], PlotStyle → {colorC}];
gr2c = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamMedianD[[simParam, All]]}],
   PlotStyle → {colorC}, Joined → True, PlotRange → All];
gr3c = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamQuantile1D[[simParam, All]]}],
   PlotStyle → {colorC}, Joined → True, PlotRange → All];
gr4c = ListLogLogPlot[Transpose[{caFact simCaList,
      rrp simParamQuantile2D[[simParam, All]]}],
   PlotStyle → {colorC}, Joined → True, PlotRange → All];
Show[gr1c, gr2c, gr3c, gr4c, PlotRange → All ]
```

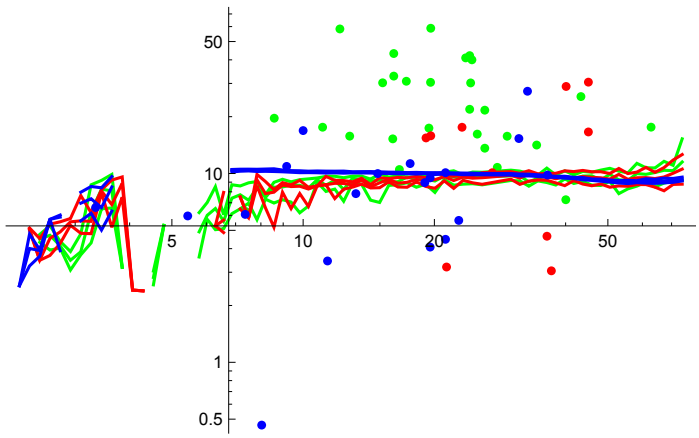
Out[507]=



C5 and C10 and D

In[508]:=
```
Show[gr1a, gr2a, gr3a, gr4a, gr1b, gr2b,
 gr3b, gr4b, gr1c, gr2c, gr3c, gr4c, PlotRange → All]
Show[gr1a, gr1b, gr1c, PlotRange → All];
```

Out[508]=



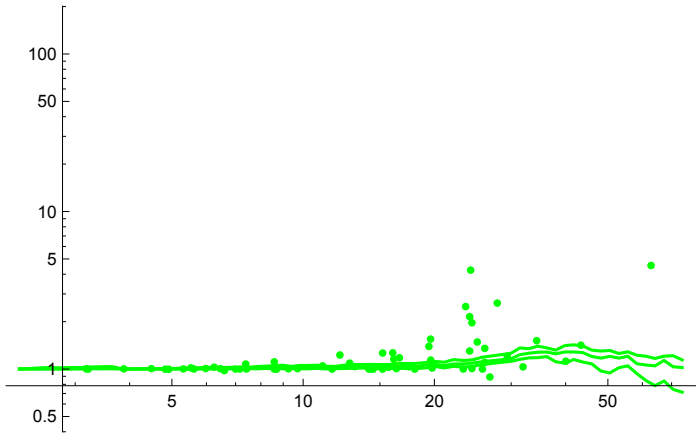
chi2 mono/bi ratio

In[510]:=
```
simParam = 6;
```

C5

In[511]:=
```
gr1a = ListLogLogPlot[
   Transpose[{dataT1C5Ca, dataT1C5ChiRatio}], PlotStyle → {colorA}];
gr2a = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamMedianC5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
gr3a = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile1C5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
gr4a = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile2C5[[simParam, All]]}],
   PlotStyle → {colorA}, Joined → True, PlotRange → All];
Show[gr1a, gr2a, gr3a, gr4a, PlotRange → {All, {-0.8, 5}} ]
If[exportYes == 1,
  Export["plot chi2Ratio C5 data.txt",
   Transpose[{dataT1C5Ca, dataT1C5ChiRatio}], "Table"];
  toExport = Transpose[{caFact simCaList, simParamQuantile1C5[[simParam, All]],
      simParamMedianC5[[simParam, All]], simParamQuantile2C5[[simParam, All]]}];
  Export["plot chi2Ratio C5 fit - quantiles and median.txt",
   toExport, "Table"];
 ];
```

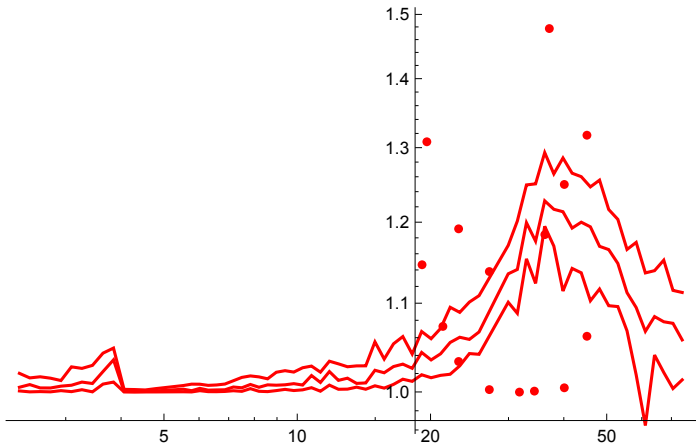
Out[515]=



C10

In[517]:=
```
gr1b = ListLogLogPlot[
   Transpose[{dataT1C10Ca, dataT1C10ChiRatio}], PlotStyle → {colorB}];
gr2b = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamMedianC10[[simParam, All]]}],
   PlotStyle → {colorB}, Joined → True, PlotRange → All];
gr3b = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile1C10[[simParam, All]]}],
   PlotStyle → {colorB}, Joined → True, PlotRange → All];
gr4b = ListLogLogPlot[Transpose[{caFact simCaList,
      simParamQuantile2C10[[simParam, All]]}],
   PlotStyle → {colorB}, Joined → True, PlotRange → All];
Show[gr1b, gr2b, gr3b, gr4b, PlotRange → All ]
If[exportYes == 1,
  Export["plot chi2Ratio C10 data.txt",
   Transpose[{dataT1C10Ca, dataT1C10ChiRatio}], "Table"];
  toExport = Transpose[{caFact simCaList, simParamQuantile1C10[[simParam, All]],
      simParamMedianC10[[simParam, All]],
      simParamQuantile2C10[[simParam, All]]}];
  Export["plot chi2Ratio C10 fit - quantiles and median.txt",
   toExport, "Table"];
 ];
```

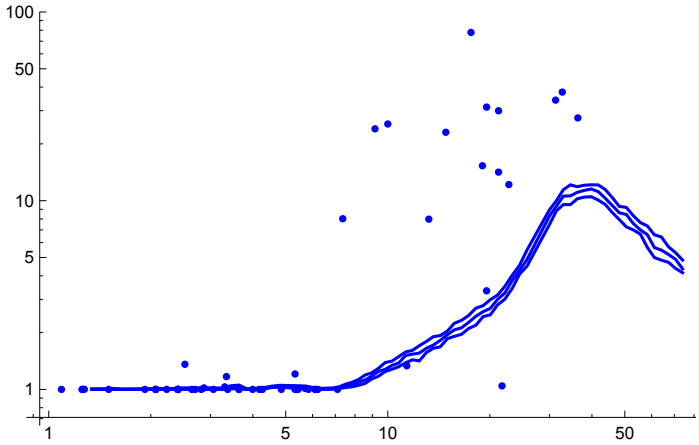
Out[521]=



D

In[523]:=
```
gr1c =
  ListLogLogPlot[Transpose[{dataT1DCa, dataT1DChiRatio}], PlotStyle → {colorC}];
gr2c = ListLogLogPlot[Transpose[
    {caFact simCaList, simParamMedianD[[simParam, All]]}],
   PlotStyle → {colorC}, Joined → True, PlotRange → All];
gr3c = ListLogLogPlot[Transpose[{caFact simCaList,
     simParamQuantile1D[[simParam, All]]}],
   PlotStyle → {colorC}, Joined → True, PlotRange → All];
gr4c = ListLogLogPlot[Transpose[{caFact simCaList,
     simParamQuantile2D[[simParam, All]]}],
   PlotStyle → {colorC}, Joined → True, PlotRange → All];
Show[gr1c, gr2c, gr3c, gr4c, PlotRange → All ]
If[exportYes == 1,
  Export["plot chi2Ratio D data.txt",
   Transpose[{dataT1DCa, dataT1DChiRatio}], "Table"];
  toExport = Transpose[{caFact simCaList, simParamQuantile1D[[simParam, All]],
     simParamMedianD[[simParam, All]], simParamQuantile2D[[simParam, All]]}];
  Export["plot chi2Ratio D fit - quantiles and median.txt", toExport, "Table"];
 ];
```

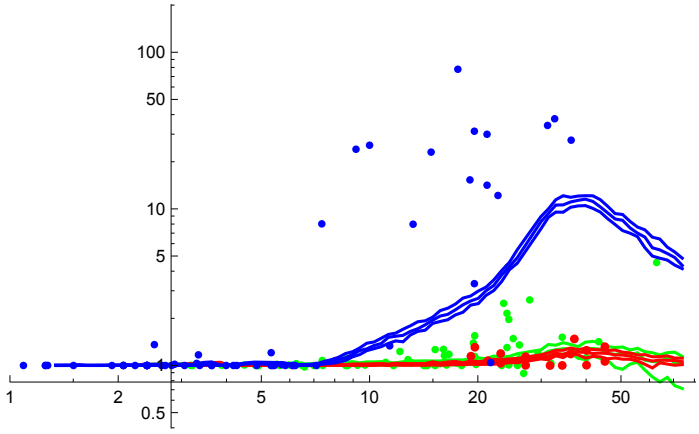
Out[527]=



C5 and C10 and D

In[529]:=
```
Show[gr1a, gr2a, gr3a, gr4a, gr1b, gr2b, gr3b,
 gr4b, gr1c, gr2c, gr3c, gr4c, PlotRange → {All, {-0.8, 5}}]
Show[gr1a, gr1b, gr1c, PlotRange → All];
```

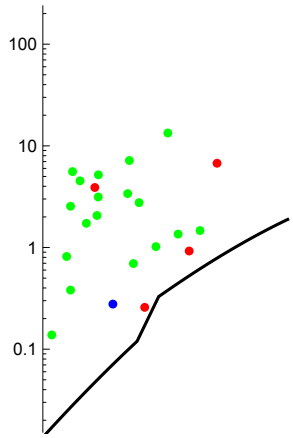
Out[529]=



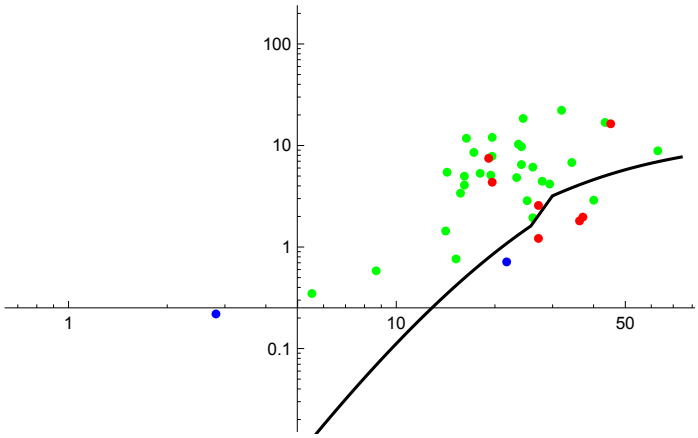
Nv

In[531]:=
```
For[NvCount = 1, NvCount ≤ 7, NvCount += 1,
  Print[" time for Nv (ms) = ", 1000 * timeOfNv[[NvCount]]];
  gr1a = ListLogLogPlot[
    Transpose[{dataT1C5Ca, dataT1C5Nv[[NvCount]]}], PlotStyle → {colorA}];
  gr1b = ListLogLogPlot[Transpose[{dataT1C10Ca, dataT1C10Nv[[NvCount]]}],
    PlotStyle → {colorB}];
  gr1c = ListLogLogPlot[Transpose[{dataT1DCa, dataT1DNv[[NvCount]]}],
    PlotStyle → {colorC}];
  gr2 = ListLogLogPlot[Transpose[{caFact simCaList, rrp simParamNv[[NvCount,
        All]]}], PlotStyle → { Black}, Joined → True, PlotRange → All];
  Show[gr1a, gr1b, gr1c, gr2, PlotRange → {All, {-4, 5}} ] // Print;
 ];
```

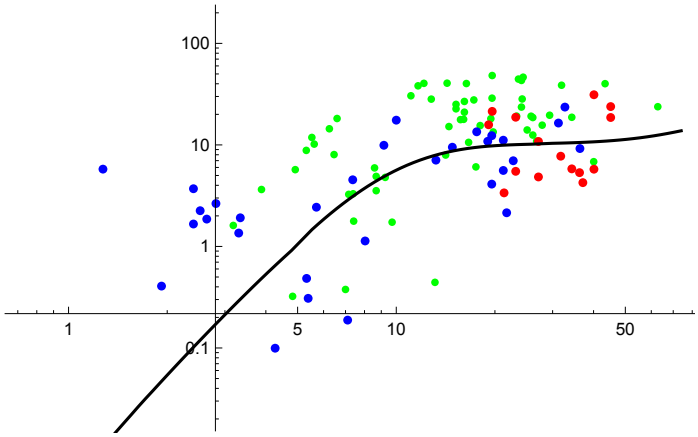
```
time for Nv (ms) = 0.1
```



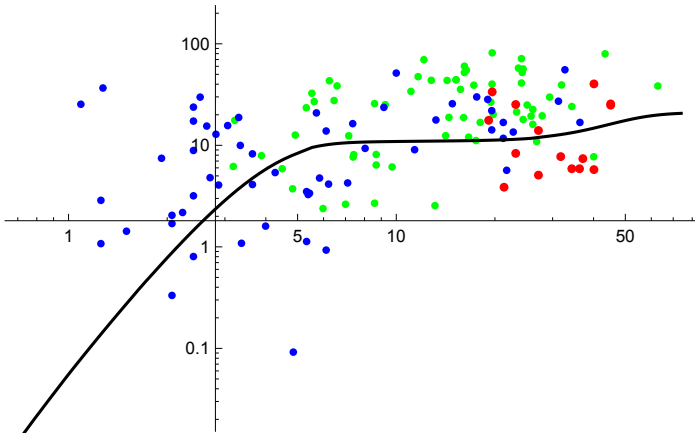

```
time for Nv (ms) = 0.2
```



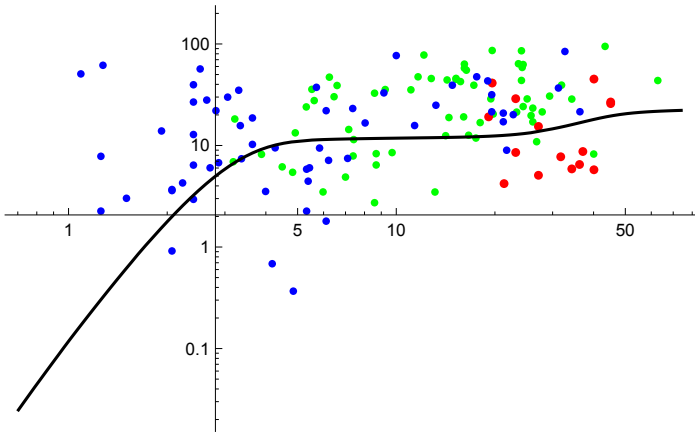
time for Nv (ms) = 1.



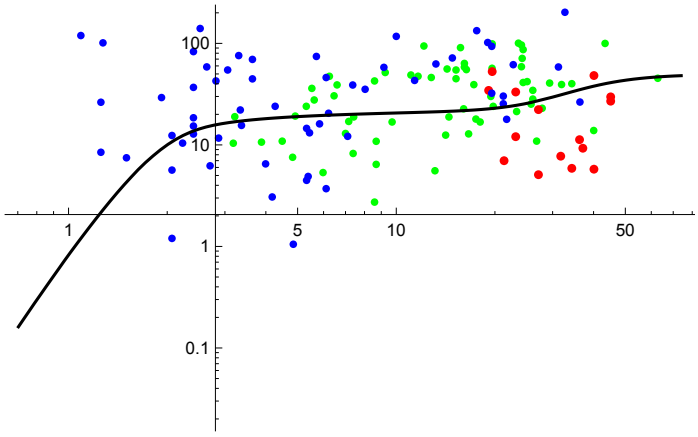
time for Nv (ms) = 5.



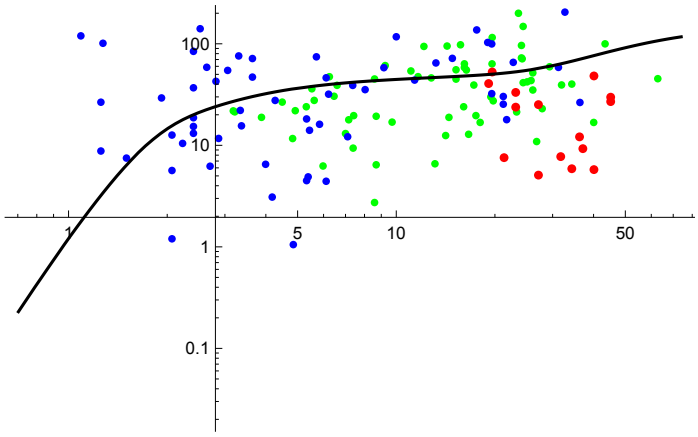
time for Nv (ms) = 10.




```
time for Nv (ms) = 100.
```




```
time for Nv (ms) = 400.
```

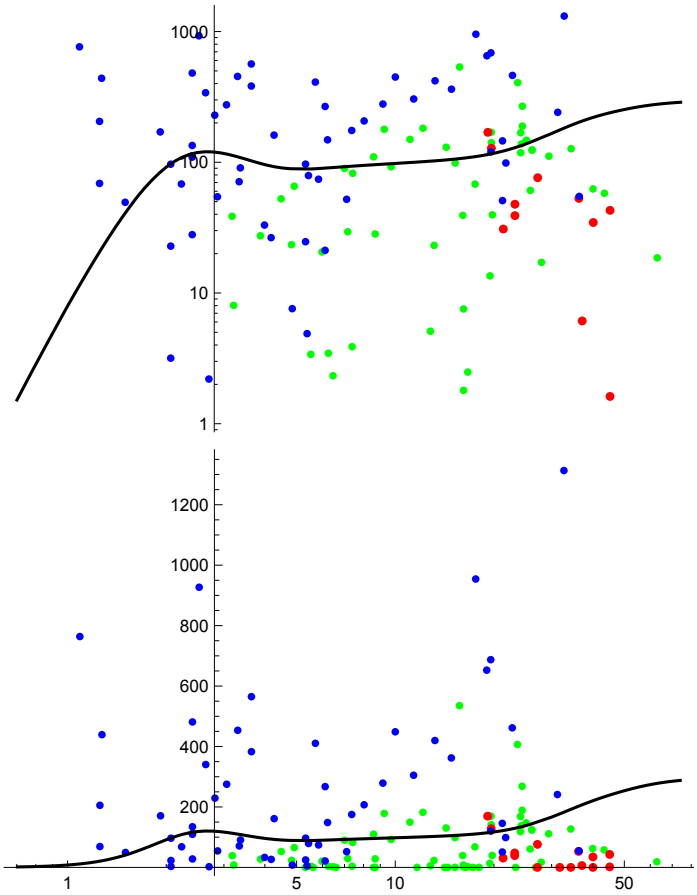


sustained release 10 to 100 ms

In[532]:=
```
ttt1 = Transpose[{dataT1C5Ca, (dataT1C5Nv[[6]] - dataT1C5Nv[[5]]) / 0.09}];
ttt2 = Transpose[{dataT1C10Ca, (dataT1C10Nv[[6]] - dataT1C10Nv[[5]]) / 0.09}];
ttt3 = Transpose[{dataT1DCa, (dataT1DNv[[6]] - dataT1DNv[[5]]) / 0.09}];
ttt4 = Transpose[
   {caFact simCaList, rrp (simParamNv[[6, All]] - simParamNv[[5, All]]) / 0.09}];

gr1a = ListLogLogPlot[ttt1, PlotStyle → {colorA}];
gr1b = ListLogLogPlot[ttt2, PlotStyle → {colorB}];
gr1c = ListLogLogPlot[ttt3, PlotStyle → {colorC}];
gr2 = ListLogLogPlot[ttt4, PlotStyle → { Black}, Joined → True, PlotRange → All];
Show[gr1a, gr1b, gr1c, gr2, PlotRange → {All, {0, 7}} ] // Print;

gr1a = ListLogLinearPlot[ttt1, PlotStyle → {colorA}];
gr1b = ListLogLinearPlot[ttt2, PlotStyle → {colorB}];
gr1c = ListLogLinearPlot[ttt3, PlotStyle → {colorC}];
gr2 = ListLogLinearPlot[ttt4,
  PlotStyle → { Black}, Joined → True, PlotRange → All];
Show[gr1a, gr1b, gr1c, gr2, PlotRange → {All, All} ] // Print;
```



In[540]:=
```
If[exportYes == 1,
  Export["plot sustained release Cm5 data.txt", ttt1, "Table"];
  Export["plot sustained release Cm10 data.txt", ttt2, "Table"];
  Export["plot sustained release D data.txt", ttt3, "Table"];
  Export["plot sustained release sim.txt", ttt4, "Table"]
 ];
```

Nv normalize to the value at 5 ms

In[541]:=
```
timeOfNv
nromPos = 5;
1000 * timeOfNv[[nromPos]]
```

Out[541]= {0.0001, 0.0002, 0.001, 0.005, 0.01, 0.1, 0.4}

Out[543]= 10.

In[544]:=
```
dataT1DNvNorm = Transpose[Transpose[dataT1DNv] / dataT1DNv[[nromPos]]];
dataT1C10NvNorm = Transpose[Transpose[dataT1C10Nv] / dataT1C10Nv[[nromPos]]];
dataT1C5NvNorm = Transpose[Transpose[dataT1C5Nv] / dataT1C5Nv[[nromPos]]];
```

In[547]:=
```
dataT1C5NvNorm // TableForm
```

Out[547]//TableForm=

0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.
0.20362	0.265687	0.42823	0.550679	0.804146	0.862111	0.657036
0.719618	0.914034	0.947765	0.995367	0.999983	0.961307	0.985586
1.	1.	1.	1.	1.	1.	1.
1.97523	1.00693	1.44309	1.00001	1.	1.38099	1.17479
1.98885	1.00693	1.64647	1.00001	1.	1.52805	1.34343

In[548]:=
```
simParamNv // TableForm
simParamNvNorm = Transpose[Transpose[simParamNv] / simParamNv[[nromPos]]];
simParamNvNorm // TableForm
```

Out[548]//TableForm=

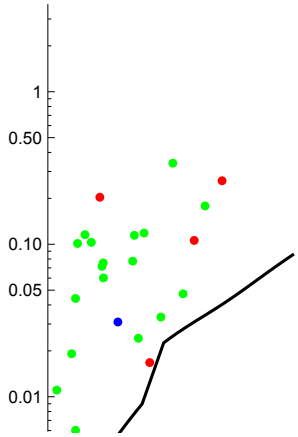
1.15733×10^{-8}	1.36603×10^{-8}	1.61585×10^{-8}	1.91541×10^{-8}	2.27515×10^{-8}	2
4.0267×10^{-7}	4.75641×10^{-7}	5.62982×10^{-7}	6.67678×10^{-7}	7.93362×10^{-7}	9
0.0000966667	0.000113574	0.00013369	0.000157653	0.000186231	0
0.00123275	0.00145309	0.00171672	0.002033	0.00241195	0
0.00248568	0.00294378	0.00349541	0.00416181	0.00496538	0
0.0161613	0.0192921	0.0230952	0.027729	0.0333661	0
0.0229784	0.0275191	0.0330541	0.039822	0.048085	0

Out[550]//TableForm=

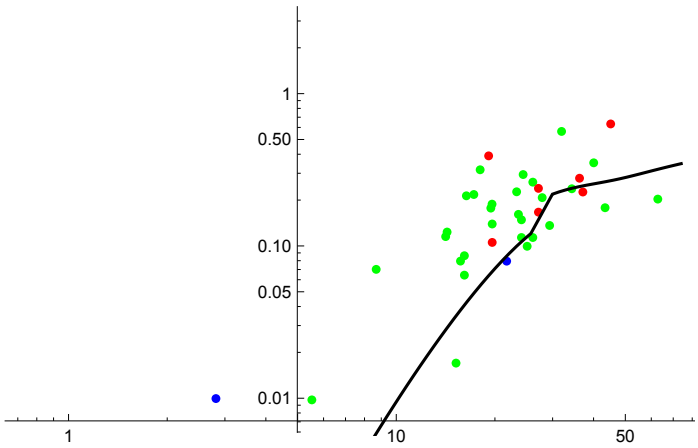
4.656×10^{-6}	4.64041×10^{-6}	4.62279×10^{-6}	4.60234×10^{-6}	4.58202×10^{-6}	4.5
0.000161996	0.000161575	0.000161064	0.00016043	0.000159779	0.0
0.0388895	0.0385811	0.0382475	0.037881	0.037506	0.0
0.495941	0.493613	0.491136	0.488489	0.485754	0.4
1.	1.	1.	1.	1.	1.
6.50175	6.55352	6.60731	6.66274	6.71976	6.7
9.24432	9.34823	9.45645	9.56845	9.68405	9.8

In[551]:=
```
For[NvCount = 1, NvCount ≤ 7, NvCount += 1,
  Print[" time for Nv (ms) = ", 1000 * timeOfNv[[NvCount]]];
  gr1a = ListLogLogPlot[
    Transpose[{dataT1C5Ca, dataT1C5NvNorm[[NvCount]]}], PlotStyle → {colorA}];
  gr1b = ListLogLogPlot[Transpose[{dataT1C10Ca, dataT1C10NvNorm[[NvCount]]}],
    PlotStyle → {colorB}];
  gr1c = ListLogLogPlot[Transpose[{dataT1DCa, dataT1DNvNorm[[NvCount]]}],
    PlotStyle → {colorC}];
  gr2 = ListLogLogPlot[Transpose[{caFact simCaList, simParamNvNorm[[NvCount,
        All]]}], PlotStyle → { Black}, Joined → True, PlotRange → All];
  Show[gr1a, gr1b, gr1c, gr2, PlotRange → {All, {-5, 1}} ] // Print;
];
```

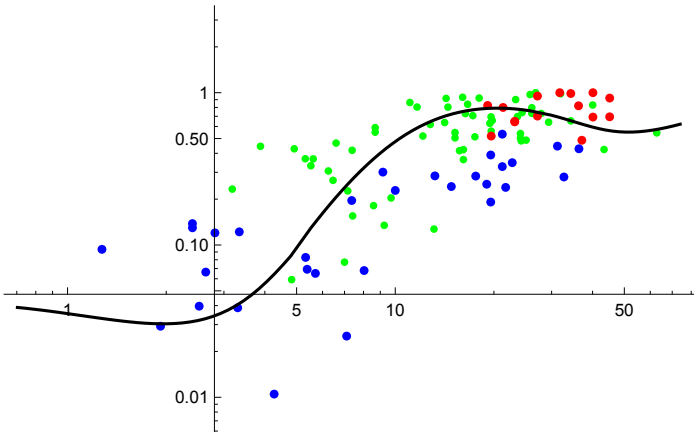
time for Nv (ms) = 0.1



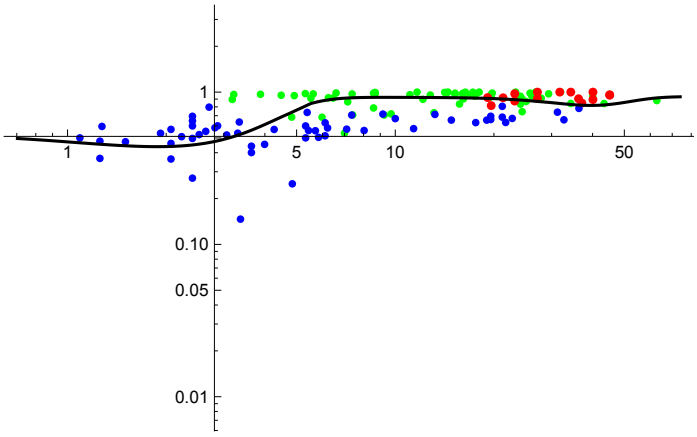
time for Nv (ms) = 0.2



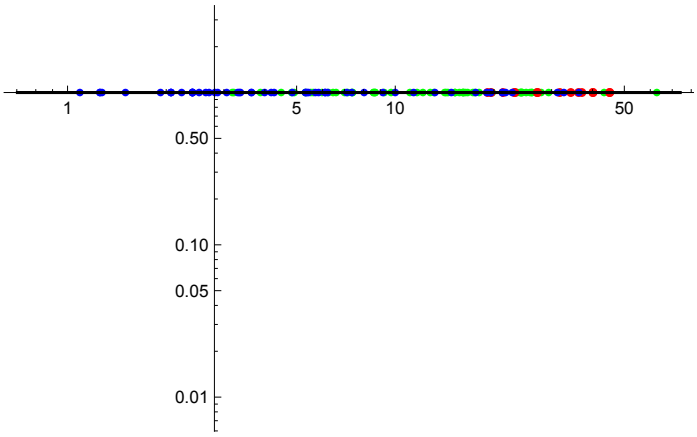
time for Nv (ms) = 1.



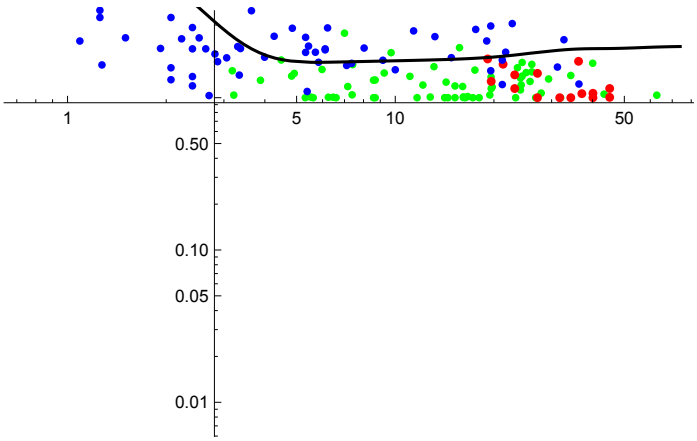
time for Nv (ms) = 5.



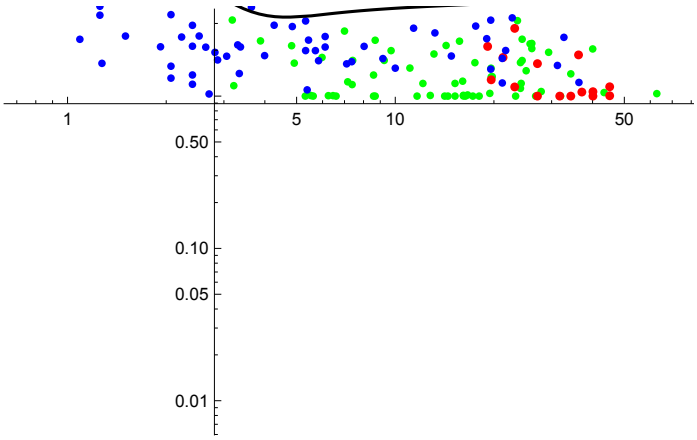
time for Nv (ms) = 10.



time for Nv (ms) = 100.




```
time for Nv (ms) = 400.
```



Export Nv

In[552]:=
```
If[exportYes == 1,
  Export["Nv export Ca,0.0001,0.0002,0.001,0.005,0.01,0.1,0.4.txt",
    Transpose[Prepend[simParamNv, caFact simCaList]], "Table"];
 ];
```

Print some values

C5

In[553]:=
```
Transpose[simParamMedianC5] // TableForm
Transpose[simParamQuantile1C5] // TableForm
Transpose[simParamQuantile2C5] // TableForm
```

Out[553]//TableForm=

0	2.70282	0.00164137	0.445734	85.8431	1.00014	0.0017
0	5.37412	0.000979399	1.31351	30.1577	1.00355	0.00139424
0	5.30097	0.000747182	1.35648	34.1843	1.00318	0.00216601
0	4.95336	0.000579422	1.35835	40.0845	1.00627	0.00164486
0	4.72407	0.000678063	1.42046	42.1996	1.00377	0.00150704
0	5.4161	0.000203916	1.43121	50.3228	1.00712	0.00149519
0	5.03787	0.000446818	1.41341	57.9572	1.00996	0.00134592
0	5.07971	-9.56824×10^{-16}	1.42711	65.8917	1.014	0.00167921
0	5.0841	0.000197891	1.45203	69.2939	1.01859	0.00117193
0	5.13254	0.000218196	1.44018	81.8372	1.01937	0.00100931
0	2.8161	0.001	1.2881	144.163	1.00085	0.00105811
0	2.75573	0.0008	1.40562	120.223	1.00056	0.0008
0	2.82804	0.0008	1.31418	171.366	1.00123	0.000841268
0	2.70917	0.000636015	1.34058	175.529	1.00178	0.0008
0	2.7055	0.000772361	1.19177	264.595	1.00229	0.0008
0	2.65597	0.000610771	1.17091	367.211	1.00495	0.00064578
0	2.66449	0.000613109	1.1693	399.442	1.00702	0.000699955
0	2.63893	0.00066202	1.16443	490.566	1.00939	0.000777518
0	2.70462	0.0006	1.14028	508.217	1.00994	0.0006
0	2.62157	0.000554405	1.15758	532.658	1.00591	0.0006
0	2.65485	0.000487477	1.13929	632.105	1.01303	0.000491013
0	2.75031	0.000516714	1.1269	677.114	1.01616	0.00057489
0	2.82544	0.000458776	1.14399	647.183	1.01237	0.000484852
0	2.85469	0.000534276	1.13148	806.097	1.0115	0.000545288
0	2.66742	0.000506491	1.14194	855.498	1.01798	0.000548985
0	2.55963	0.0004	1.13209	878.939	1.01395	0.000484687
0	2.59043	0.000438059	1.12871	1025.16	1.01624	0.000452866
0	2.83314	0.0004	1.12987	981.849	1.02003	0.000428027
0	2.74935	0.000401258	1.13276	1082.44	1.02601	0.000467607
0	2.6651	0.0004	1.13884	1174.72	1.0211	0.000447969
0	2.92617	0.0004	1.13015	1307.43	1.02734	0.0004
0	2.73809	0.000333768	1.12083	1297.15	1.01817	0.000396129
0	2.64149	0.000360572	1.12166	1363.88	1.02169	0.0004
0	2.79487	0.000218709	1.12819	1280.06	1.03176	0.000334192
0	2.71865	0.000312727	1.12296	1596.01	1.04159	0.000338815
0	2.63146	0.0002	1.13232	1396.74	1.03678	0.000323376
0	2.78931	0.000306679	1.11611	1965.95	1.03135	0.000364684
0	2.83165	0.000282851	1.13642	1777.03	1.03663	0.000350877
0	2.75026	0.0002	1.14535	1782.2	1.02994	0.000280777
0	2.905	0.000211555	1.13567	2159.29	1.03333	0.000313165
0	2.79186	0.0002	1.14173	1943.07	1.05063	0.000261803
0	2.66293	0.0002	1.16027	1783.82	1.03261	0.000203266
0	2.84773	0.000165665	1.14512	1896.16	1.06111	0.000239234
0	2.74513	0.000153941	1.16059	1735.73	1.06952	0.000217183
0	2.78181	0.000164596	1.16049	2346.19	1.05381	0.000204851
0	2.89466	0.000165445	1.16224	2623.77	1.07707	0.000294935
0	2.91732	0.0000792865	1.1825	1896.41	1.07864	0.000196037

0	3.0238	0.00013388	1.17489	2211.25	1.09242	0.000202232
0	2.89754	0.0000836329	1.20582	2133.49	1.11352	0.000236773
0	3.07282	-0.0002	1.30968	1300.43	1.16248	0.000180908
0	3.42178	-0.000206339	1.34995	987.976	1.23397	0.000196404
0	3.29111	-0.000352449	1.39739	798.274	1.26047	0.000190987
0	3.48169	-0.0004	1.4607	622.899	1.27952	0.000196413
0	3.46234	-0.000368664	1.52109	604.119	1.28255	0.000178013
0	3.42941	-0.000472183	1.63238	486.933	1.24957	0.000170637
0	3.58817	-0.000589469	1.68191	453.82	1.28469	0.000193364
0	3.64267	-0.000478755	1.79224	420.119	1.2844	0.000197627
0	3.44789	-0.000553521	1.84017	432.253	1.27258	0.000197081
0	3.32497	-0.000526312	1.90146	435.02	1.20168	0.000197808
0	3.39911	-0.000595416	1.95013	410.217	1.17376	0.000198942
0	3.51972	-0.000528629	2.01561	428.113	1.2043	0.000198233
0	3.21868	-0.000411828	2.05029	454.83	1.1748	0.000196157
0	3.18998	-0.0004	2.08015	478.082	1.20511	0.000193528
0	3.28586	-0.00036506	2.07948	518.159	1.08122	0.000197806
0	3.30883	-0.000331139	2.1148	563.133	1.06096	0.000261134
0	2.99943	-0.00031955	2.12313	601.271	1.04764	0.000195055
0	3.20467	-0.000294693	2.11949	663.922	1.13456	0.000195881
0	3.08387	-0.000273292	2.12867	716.955	1.03453	0.00019117
0	2.99604	-0.0002	2.13769	832.004	1.0219	0.000194634

Out[554]//TableForm=

0	2.38587	0.000651108	0.191117	20.9842	0.998963	0.000591986
0	4.80975	-0.000846549	1.18261	21.3089	1.00032	-0.000657039
0	4.59019	-0.000303843	1.24059	26.4158	1.00024	-1.18163×10^{-1}
0	4.595	-0.001	1.2922	26.81	1.00038	-0.000119109
0	4.40144	-0.00056401	1.32665	36.4215	1.	0.000566454
0	4.72376	-0.001	1.3565	43.0531	1.00072	0.000265432
0	4.50131	-0.000439756	1.33962	52.375	1.00074	0.000413705
0	4.50707	-0.000681729	1.38364	58.1677	1.00463	0.000450425
0	4.61274	-0.000353154	1.39592	61.9684	1.00367	0.00014217
0	4.52789	-0.000702739	1.40445	71.0746	1.00428	0.000245208
0	2.34202	0.000530968	1.05367	64.8896	1.	0.0006
0	2.39482	0.000341794	1.05197	71.7036	1.00001	0.000545286
0	2.47835	0.000461705	1.13556	116.824	1.00012	0.000544211
0	2.32453	0.000341145	1.19323	123.304	1.	0.0004
0	2.39259	0.000472796	1.09886	181.348	1.00009	0.0004
0	2.40436	0.000412356	1.12153	296.44	1.00007	0.000370949

0	2.27854	0.0004	1.11012	321.949	1.00041	0.000484699
0	2.41364	0.00035463	1.11743	386.94	1.00253	0.000400866
0	2.38695	0.000425416	1.09132	437.086	1.00272	0.000426178
0	2.37223	0.0004	1.11414	435.141	1.00038	0.0004
0	2.32822	0.0004	1.11245	511.358	1.00231	0.0004
0	2.49113	0.0004	1.09491	547.781	1.004	0.000411596
0	2.27813	0.000315695	1.12074	566.735	1.00609	0.000386057
0	2.34765	0.0004	1.10319	689.953	1.00331	0.0004
0	2.40467	0.000406002	1.09624	727.201	1.00838	0.000479823
0	2.31111	0.0002	1.09148	690.655	1.00481	0.000289456
0	2.30852	0.000317141	1.10872	769.869	1.0034	0.000316757
0	2.4233	0.0002	1.09372	745.72	1.0045	0.000358641
0	2.40803	0.000249001	1.10567	815.886	1.004	0.00030259
0	2.35054	0.000263926	1.10308	877.443	1.00365	0.000318202
0	2.54174	0.0002	1.09921	1074.25	1.01014	0.000286821
0	2.34286	0.000188034	1.10327	1026.36	1.00169	0.000271468
0	2.24185	0.000217648	1.09853	1072.98	1.00469	0.00025022
0	2.45444	0.000105792	1.10063	913.029	1.00825	0.0002
0	2.48652	0.000158229	1.10262	1109.29	1.01199	0.000213935
0	2.25842	0.000116726	1.11612	1137.91	1.01468	0.0002
0	2.40053	0.000162892	1.09411	1289.45	1.01342	0.000262215
0	2.40988	0.000133622	1.1235	1134.96	1.00428	0.0002
0	2.54016	0.0000557483	1.11882	1263.45	1.0098	0.000144806
0	2.68649	0.00013989	1.10827	1437.86	1.00813	0.0002
0	2.50636	0.000081628	1.12162	1442.85	1.01383	0.000164915
0	2.28309	0.0000586613	1.12495	1330.75	1.00671	0.000158922
0	2.51973	-8.65262×10^{-6}	1.12056	1273.39	1.01792	0.000142491
0	2.42315	-2.51407×10^{-16}	1.13498	1242.17	1.03767	0.000172859
0	2.55964	0.00001316	1.14372	1549.29	1.01711	0.000147884
0	2.53501	-4.36551×10^{-17}	1.14077	1657.96	1.04089	0.000133679
0	2.62588	-0.0000493415	1.15057	1187.47	1.02889	0.00011933
0	2.55578	-0.0000149974	1.15831	1429.03	1.04044	0.000146699
0	2.70367	-0.0000692836	1.18605	1086.68	1.06848	0.000169218
0	2.69901	-0.000366337	1.2862	769.428	1.12014	0.0000463369
0	3.10509	-0.000402302	1.30469	630.8	1.15261	0.000136689
0	2.95018	-0.000420474	1.35673	573.18	1.17766	0.000124708
0	3.08794	-0.0006	1.42446	487.815	1.18173	0.000149461
0	3.13696	-0.000667755	1.46948	419.99	1.20015	0.000135406
0	2.88975	-0.000650659	1.57738	416.881	1.11245	-0.0000157536
0	3.03861	-0.000760757	1.65251	368.707	1.08926	-3.04819×10^{-1}
0	3.19018	-0.000686577	1.73287	372.717	1.15042	0.000137389
0	2.97397	-0.000774769	1.7851	361.008	1.10907	0.00019167
0	2.78582	-0.000622425	1.84323	352.228	1.07852	0.0000420838
0	3.00617	-0.000732876	1.91716	361.143	0.972508	0.000152717
0	3.03048	-0.0006	1.94398	375.533	0.945001	0.000148349
0	2.94457	-0.000575123	1.99343	391.458	1.01979	-3.39929×10^{-1}
0	2.89565	-0.000516915	2.02301	443.709	1.04807	0.000065189
0	2.85631	-0.000444385	2.03181	472.367	0.935238	0.0000224441
0	2.82349	-0.000413191	2.07346	488.64	0.845951	0.000139025
0	2.6647	-0.0004	2.087	554.038	0.785065	0.000103313
0	2.84712	-0.000380414	2.0868	586.295	0.83964	0.0000904431
0	2.69965	-0.000340518	2.09961	663.416	0.743155	2.38918×10^{-17}
0	2.68269	-0.00029802	2.10583	718.635	0.713015	-2.05975×10^{-1}

Out[555]//TableForm=

0	2.98834	0.00278824	1.73682	496.731	1.00377	0.00249021	2
0	5.72998	0.00251322	1.60125	40.4423	1.00846	0.00290971	3
0	5.77192	0.00197387	1.54067	42.3428	1.01805	0.00388884	2
0	5.52567	0.00199104	1.56928	47.3241	1.02274	0.00354957	3
0	5.20519	0.00208461	1.5317	54.7005	1.01903	0.0032822	5
0	5.91172	0.00165426	1.49998	56.8688	1.02244	0.00299875	2
0	5.39679	0.00122663	1.46811	68.9601	1.0229	0.00264808	4
0	5.53061	0.001	1.48366	73.7315	1.03063	0.0027252	6
0	5.71077	0.001	1.49298	86.1002	1.03543	0.00203889	1
0	5.53328	0.001	1.48377	97.3031	1.03746	0.002	1
0	3.14703	0.0016	2.05626	206.236	1.0038	0.0016	2
0	3.15991	0.00119765	2.10864	242.653	1.00367	0.00134141	4
0	3.20233	0.00115197	1.61591	246.626	1.00629	0.0014	2
0	3.13293	0.001	1.62314	240.822	1.00746	0.0012	2
0	3.05894	0.00110243	1.3918	346.666	1.00438	0.0012	2
0	3.03039	0.00097103	1.27612	484.462	1.01872	0.001	1
0	3.15752	0.0008	1.23044	492.363	1.02003	0.000996887	2
0	3.13299	0.000938932	1.20616	629.14	1.02575	0.00107637	5
0	3.03639	0.0008	1.16896	691.996	1.02497	0.000935691	4
0	2.98286	0.00071932	1.21743	582.657	1.02383	0.000836678	2
0	2.95545	0.0006	1.17239	721.002	1.02698	0.000644567	7
0	3.24589	0.000728526	1.1713	860.654	1.0248	0.0008	5
0	3.06577	0.000568363	1.16691	759.648	1.0262	0.000686661	5
0	3.21791	0.0006	1.16067	971.702	1.03824	0.00073318	7
0	3.27837	0.0006	1.18578	983.123	1.04355	0.000701308	1
0	2.98517	0.000518699	1.14987	1008.76	1.05068	0.000596025	7
0	3.03762	0.000582864	1.14734	1252.47	1.05794	0.000665091	5
0	3.23546	0.00047485	1.16637	1196.88	1.0397	0.000544783	8
0	3.13124	0.000509261	1.15929	1294.77	1.05399	0.000577231	8
0	2.96595	0.00048003	1.16376	1586.27	1.05372	0.000548453	2
0	3.24194	0.000492463	1.15223	1586.81	1.05871	0.000520281	1
0	3.07277	0.000501172	1.15172	1996.76	1.04356	0.000520185	6
0	2.93929	0.000447076	1.14954	1816.72	1.03914	0.000511983	6
0	3.09958	0.00038491	1.16893	1906.85	1.05745	0.000485154	1
0	3.0039	0.000476936	1.14667	2446.42	1.06789	0.000518761	8
0	3.13436	0.000354069	1.17073	2054.21	1.06876	0.0004	8
0	3.09239	0.000397793	1.13886	2761.86	1.07068	0.000520989	6
0	3.16194	0.000428821	1.16836	2243.4	1.06872	0.000458376	7
0	3.16901	0.00032251	1.16694	2429.45	1.06865	0.000347099	5
0	3.19017	0.000377083	1.15598	3363.02	1.0847	0.000398083	6
0	3.21484	0.000307076	1.17289	2682.46	1.08552	0.000383795	1
0	2.9211	0.000280917	1.18832	3279.61	1.08532	0.000345411	6
0	3.12922	0.000258845	1.17838	3331.21	1.10125	0.00035825	1
0	3.08649	0.0002	1.18448	3173.92	1.1168	0.000353163	9
0	3.06285	0.000296124	1.18653	3549.47	1.10562	0.000367234	1
0	3.22398	0.000265181	1.19682	3930.39	1.14899	0.000394031	1
0	3.33886	0.0002	1.20689	3485.42	1.13376	0.000382313	1
0	3.46378	0.000251486	1.22532	4565.63	1.14501	0.000363647	1

0	3.21918	0.0002	1.23106	3357.16	1.18916	0.000392033	1
0	3.50622	-1.67441×10^{-17}	1.35327	1687.09	1.25895	0.000220547	1
0	3.8409	-2.85506×10^{-6}	1.39814	1735.04	1.36137	0.00025428	2
0	3.67024	-0.0002	1.45067	1122.57	1.34735	0.000254875	2
0	3.80967	-0.0002	1.51813	856.08	1.39859	0.000273465	2
0	3.9002	-0.0002	1.60047	828.362	1.36265	0.000280338	2
0	3.96185	-0.000372654	1.66213	617.502	1.31916	0.000285226	5
0	4.05624	-0.0004	1.76042	551.26	1.40972	0.000396062	2
0	3.96973	-0.000397649	1.83713	549.658	1.42527	0.000351046	4
0	3.96164	-0.0004	1.91585	494.294	1.40319	0.000388692	3
0	3.95683	-0.000398125	1.97413	494.864	1.319	0.00038885	2
0	3.79214	-0.000427591	2.00924	464.243	1.30182	0.00039656	2
0	3.82373	-0.0004	2.07898	516.526	1.31248	0.000414398	2
0	3.71089	-0.000361273	2.09076	501.76	1.25505	0.000423528	2
0	3.53382	-0.000306624	2.11752	522.681	1.28725	0.000390542	2
0	3.64082	-0.000263093	2.12665	632.824	1.22445	0.000422061	2
0	3.88071	-0.000255807	2.15247	610.247	1.20658	0.000421685	2
0	3.28817	-0.00023595	2.17347	651.073	1.16822	0.000437795	2
0	3.7988	-0.0002	2.15438	754.106	1.20689	0.000453484	2
0	3.38892	-0.0002	2.15657	795.867	1.21626	0.000422412	2
0	3.29678	-0.000148587	2.17467	942.035	1.14298	0.000532219	2

C10

In[556]:=
```
Transpose[simParamMedianC10] // TableForm
Transpose[simParamQuantile1C10] // TableForm
Transpose[simParamQuantile2C10] // TableForm
```

Out[556]//TableForm=

0	5.21032	0.00150655	1.32551	30.1363	1.00505	0.003	1
0	5.10239	0.00100228	1.42531	31.6956	1.00795	0.00123813	1
0	5.09306	0.000506281	1.38732	38.7025	1.00434	0.00190111	1
0	5.01677	0.00032365	1.36891	48.1968	1.00428	0.00117783	1
0	5.29503	0.000505233	1.42857	48.3426	1.00624	0.00114352	1
0	5.19965	0.000140273	1.44792	54.0277	1.00723	0.00138569	1
0	5.13742	6.51199×10^{-18}	1.45182	61.7484	1.01066	0.00118514	1

0	5.2768	0.000481297	1.44334	73.9507	1.00911	0.001	1
0	5.36409	0.0000241556	1.4537	79.7799	1.0221	0.00138269	1
0	5.10791	0.000146312	1.44874	86.7218	1.03507	0.0010943	1
0	8.14816	0.00067081	1.42829	127.621	1.0005	0.0007	1
0	8.26279	0.000785994	1.35886	154.183	1.0002	0.000900714	1
0	8.13237	0.000662674	1.29809	177.027	1.0005	0.000684158	1
0	8.39068	0.0007	1.26479	240.208	1.00111	0.000734644	1
0	8.42703	0.000670054	1.17642	363.851	1.00295	0.000702654	1
0	8.13995	0.0006	1.16625	430.573	1.00134	0.000672414	1
0	8.56912	0.000528142	1.14408	476.151	1.00386	0.0006	1
0	8.20289	0.000593747	1.15422	490.668	1.00195	0.0006	1
0	8.22772	0.0006	1.13525	606.335	1.00218	0.000685082	1
0	8.36485	0.0005877	1.14461	628.256	1.00233	0.0006	1
0	8.31118	0.000432368	1.14974	603.158	1.00532	0.000555968	1
0	8.06672	0.000513027	1.15419	672.382	1.00449	0.000524964	1
0	8.3205	0.000424532	1.13981	743.126	1.00807	0.000478645	1
0	8.27141	0.0005	1.12839	852.128	1.00505	0.0005	1
0	8.24984	0.000410023	1.13022	885.505	1.00766	0.000446063	1
0	8.37453	0.000367669	1.1323	902.147	1.00727	0.0004	1
0	8.20344	0.000348182	1.139	940.398	1.00771	0.000431629	1
0	8.4787	0.0004	1.13178	1085.31	1.00894	0.000449396	1
0	8.11801	0.000330483	1.13214	1156.3	1.00744	0.000430524	1
0	8.2188	0.000286727	1.13094	1097.74	1.01779	0.000343241	1
0	8.23596	0.0003	1.12151	1338.81	1.01024	0.000322795	1
0	8.1276	0.000269519	1.1398	1228.93	1.02213	0.000389415	1
0	8.29209	0.0003	1.1266	1444.05	1.01252	0.000321773	1
0	8.21039	0.000279485	1.13142	1521.53	1.0149	0.000311878	1
0	8.54753	0.000231711	1.12442	1450.86	1.00922	0.0003	1
0	8.62947	0.000257313	1.13081	1587.45	1.00974	0.0003	1
0	8.5341	0.000227438	1.12294	1794.31	1.02355	0.0003	1
0	8.36857	0.000224016	1.12244	2175.43	1.02083	0.000266612	1
0	8.50279	0.000167632	1.13689	1764.42	1.02765	0.000268076	1
0	8.47157	0.000192697	1.13327	1839.87	1.03033	0.000212618	2
0	8.279	0.0002	1.13845	2075.56	1.02569	0.000243692	1
0	8.62833	0.000102726	1.14735	1801.59	1.04337	0.000251941	1
0	8.43447	0.000106546	1.15031	2056.71	1.03499	0.0002	2
0	8.69715	0.0001	1.15863	1859.41	1.04182	0.000190691	1
0	8.38615	0.0001	1.16853	1992.97	1.05458	0.000187487	3
0	9.01107	0.00010993	1.16964	2641.27	1.0605	0.000247472	4
0	9.01758	0.0001	1.18193	1904.93	1.05806	0.000196093	2
0	9.09154	0.0000175517	1.22079	1644.74	1.06655	0.000178991	1
0	9.15842	-0.0001	1.2954	1272.99	1.13529	0.000170317	2
0	9.32706	-0.0002	1.34519	991.826	1.14058	0.000131535	2
0	9.75014	-0.000122887	1.37294	975.838	1.19936	0.000155661	3
0	9.85643	-0.000337952	1.49101	619.256	1.17578	0.000122644	2
0	9.74961	-0.0004	1.52691	617.588	1.22784	0.000178082	3
0	9.94601	-0.000429498	1.60052	519.183	1.21674	0.00014149	2
0	10.1909	-0.000522179	1.69397	468.092	1.21356	0.000151693	2
0	10.2351	-0.000457238	1.75199	480.083	1.19241	0.0001	2
0	10.0749	-0.0005	1.83749	433.129	1.2	0.000156016	2
0	9.28597	-0.000443503	1.88592	453.367	1.19401	0.000100558	2
0	9.70008	-0.0005	1.94632	441.098	1.16928	0.000147797	2
0	9.53401	-0.000480432	2.01468	416.578	1.16522	0.000177186	2
0	10.0147	-0.0004	2.02457	470.207	1.14799	0.000126865	2
0	9.15472	-0.0004	2.055	488.937	1.11253	0.000146213	2
0	9.23724	-0.000390217	2.08924	517.804	1.09487	0.000172849	2
0	9.60474	-0.000329585	2.0955	566.819	1.06725	0.000163619	2
0	8.94595	-0.000278397	2.10419	651.391	1.08431	0.0000994591	2
0	9.11698	-0.000239911	2.11245	685.274	1.07829	0.0001	2
0	8.90678	-0.000235254	2.12361	739.637	1.07649	0.0000982299	2
0	8.82007	-0.000215998	2.12966	802.011	1.05748	0.0001	2

Out[557]//TableForm=

0	4.75941	−0.000567624	1.12989	22.3421	1.00109	-2.75328×10^{-15}
0	4.5965	−0.001	1.26577	23.9899	1.0001	−0.001
0	4.7078	−0.001	1.24747	26.3351	1.0004	0.000181527
0	4.66828	−0.001	1.30727	35.2718	1.00011	2.99123×10^{-15}
0	4.90216	−0.000165677	1.35574	42.2998	1.00141	0.000821254
0	4.77507	−0.001	1.38752	46.7239	1.00034	0.0000126014
0	4.58853	−0.001	1.38477	54.8567	1.0024	8.47395×10^{-15}
0	4.4545	−0.000230927	1.41428	64.2793	1.00011	0.000408371
0	5.0219	−0.001	1.41203	68.5836	1.00847	0.000185087
0	4.83132	−0.000556536	1.41023	79.1197	1.01067	0.000800656
0	7.54367	0.00048773	1.10251	70.0809	1.	0.000513194
0	7.8279	0.000350939	1.11782	114.313	1.	0.0005
0	7.35067	0.000284781	1.13393	119.43	0.999999	0.000331431
0	7.58642	0.000458199	1.15482	185.106	1.00001	0.0005
0	7.51254	0.000480858	1.13206	316.949	1.00018	0.0005269
0	7.35825	0.000453305	1.12824	351.584	1.00001	0.00044758
0	7.97494	0.000436357	1.10951	380.693	1.00136	0.000414797
0	7.70855	0.000399881	1.10856	387.172	1.00033	0.0004
0	7.38461	0.000473824	1.10758	473.899	1.00028	0.0005
0	7.40014	0.000321104	1.1038	526.71	1.00055	0.000370571
0	7.92296	0.000226759	1.11557	467.778	1.0013	0.0004
0	7.44274	0.000334469	1.1281	593.586	1.00066	0.0004
0	7.56469	0.000309796	1.11666	650.145	1.00355	0.0003
0	7.71817	0.000341857	1.10804	724.491	1.0007	0.0004
0	7.53985	0.000257966	1.09485	760.892	1.00036	0.000374626
0	7.44721	0.0002	1.10576	723.951	1.00147	0.000210268
0	7.53337	0.000194335	1.10653	738.393	1.00278	0.000254545
0	7.72551	0.000268139	1.10549	904.008	1.00151	0.0003
0	7.65307	0.000222129	1.10695	976.289	1.00226	0.000336566
0	7.52005	0.000194768	1.11498	966.974	1.00459	0.000243254
0	7.73415	0.0002	1.09963	1020.06	1.00079	0.000234065
0	7.64203	0.000138411	1.12481	970.491	1.00738	0.000275098
0	7.59822	0.000129777	1.10427	1197.83	1.00287	0.0002
0	7.49187	0.000127017	1.09484	1160.26	1.00304	0.00022818
0	7.86256	0.0001	1.10958	1129.01	1.00519	0.0002
0	7.92786	0.000131994	1.10148	1280.97	1.00291	0.00017904
0	7.7048	0.000158546	1.10248	1276.23	1.00663	0.0002
0	7.73421	0.000153675	1.10907	1494.89	1.00414	0.0002
0	8.02283	0.0000878571	1.10931	1477.1	1.00812	0.00018312
0	7.84419	0.0000133437	1.10848	1420.01	1.01379	0.000176696

0	7.80874	0.0000936858	1.11481	1611.19	1.01145	0.000139525
0	7.93011	0.0000107288	1.12832	1316.15	1.01863	0.000183276
0	7.54741	4.97672×10^{-6}	1.12933	1482.65	1.01541	0.0001
0	7.87585	0.0000165953	1.14117	1495.97	1.01798	0.0001
0	7.92188	2.12364×10^{-6}	1.14634	1391.77	1.01919	0.000145389
0	8.22595	0.0000258813	1.1347	1750.8	1.02843	0.000165038
0	8.06424	-0.0000659493	1.16173	1280.33	1.0421	0.000129576
0	8.3373	-0.0001	1.19037	1139.21	1.04125	0.0001
0	8.3364	-0.000274935	1.25752	926.211	1.10111	0.0000984448
0	8.78758	-0.000316755	1.3164	755.274	1.08812	0.0000648554
0	8.75401	-0.000475103	1.34952	637.571	1.15369	0.0000976299
0	8.99265	-0.0006	1.44585	494.565	1.12367	0.0000758286
0	9.18089	-0.0006	1.46583	490.429	1.1947	0.0000955461
0	9.07243	-0.000635738	1.57421	409.495	1.16957	0.0000962568
0	9.33576	-0.000722632	1.63965	388.71	1.11449	0.0000658811
0	9.44953	-0.0006	1.70753	416.731	1.14189	0.000045536
0	9.0315	-0.000649725	1.77025	370.91	1.13652	0.0000931994
0	8.64489	-0.000591978	1.82122	398.856	1.10287	1.92952×10^{-18}
0	9.26302	-0.000616883	1.90997	392.375	1.11688	0.0000840937
0	8.91436	-0.000623925	1.97004	388.45	1.09706	0.0000960257
0	9.28163	-0.000515951	1.98702	417.186	1.09602	0.0000711143
0	8.74897	-0.0005	2.01348	443.461	1.06781	0.0000845751
0	8.22809	-0.000478032	2.04508	447.543	1.01843	-9.98657×10^{-6}
0	8.88343	-0.000423656	2.06545	504.551	0.964704	0.0000709661
0	8.07362	-0.000369587	2.06075	573.961	1.04043	0.0000549279
0	8.54714	-0.000324194	2.08322	646.21	1.02114	0.0000401835
0	8.36031	-0.000312662	2.10033	690.982	1.00363	0.0000281846
0	7.93428	-0.000271752	2.10171	751.076	1.01308	-0.0000211522

Out[558]//TableForm=

0	5.63177	0.003	1.53926	42.0458	1.02018	0.005	2.
0	5.59603	0.0029886	1.58389	41.9806	1.01519	0.00393717	7.
0	5.49234	0.00183746	1.51172	48.9206	1.01642	0.00336962	2.
0	5.69466	0.00161081	1.47258	52.857	1.01488	0.00288809	14
0	5.52272	0.001948	1.5153	58.6748	1.01233	0.003	2.
0	5.58595	0.00123141	1.52439	65.6496	1.02733	0.00254791	6.
0	5.59245	0.00132848	1.50271	76.9693	1.02561	0.00227853	13

0	5.65157	0.00159004	1.48158	82.848	1.02895	0.00208743	10
0	5.87536	0.001	1.49361	96.2346	1.04253	0.002	13
0	5.42231	0.000846778	1.49039	103.318	1.04826	0.00198196	12
0	9.11535	0.0011	2.04683	203.862	1.00279	0.0013	2.
0	9.09165	0.0011043	1.57536	240.636	1.00258	0.00140839	2.
0	8.91618	0.00109831	1.61574	262.706	1.00214	0.00112161	2.
0	9.45413	0.0009	1.35281	288.518	1.00359	0.001	2.
0	9.47293	0.0009	1.22529	458.633	1.00694	0.000902321	1.
0	9.0228	0.0008	1.20326	492.042	1.00842	0.0008	1.
0	9.43472	0.000744231	1.18052	534.757	1.00834	0.0009	1.
0	8.65657	0.000763203	1.21209	563.014	1.0071	0.0008	1.
0	9.00847	0.000865072	1.16554	736.216	1.00753	0.000900001	2.
0	9.25365	0.000725286	1.16904	739.525	1.00853	0.000766439	2.
0	8.95425	0.0006	1.19153	729.218	1.01211	0.000735296	3.
0	8.67623	0.0006	1.16696	762.21	1.01575	0.000759422	3.
0	8.86238	0.000590719	1.16352	869.903	1.01737	0.000642038	4.
0	9.10605	0.000568806	1.15038	938.072	1.01632	0.0006	2.
0	9.18549	0.000531005	1.16192	1001.94	1.0142	0.0006	4.
0	9.08607	0.0005	1.16418	1113.25	1.02139	0.000579751	4.
0	8.99209	0.000522785	1.1593	1131.96	1.02311	0.000563661	2.
0	9.05518	0.000529443	1.16092	1380.91	1.02157	0.000555837	4.
0	8.65172	0.00046386	1.14716	1408.15	1.02633	0.0005	6.
0	8.82231	0.000454765	1.15726	1325.74	1.02817	0.000490033	6.
0	8.93631	0.000422035	1.15725	1551.93	1.02151	0.000448671	3.
0	9.06797	0.000371681	1.15702	1789.57	1.03357	0.0004754	9.
0	8.93374	0.0004	1.16251	1925.08	1.03064	0.000448404	5.
0	9.07883	0.00038894	1.15285	2016.39	1.02743	0.00043363	5.
0	9.19721	0.0003	1.15339	1895.26	1.02838	0.000317141	6.
0	9.55398	0.000344206	1.15056	2345.69	1.02846	0.0004	4.
0	9.12183	0.0003	1.15135	2371.07	1.05525	0.000371695	6.
0	9.49068	0.0003	1.15431	2679.32	1.03596	0.000378676	7.
0	9.03178	0.000260194	1.15723	2379.41	1.05306	0.000340369	7.
0	9.47447	0.000271157	1.15782	3160.74	1.06129	0.0003	5.
0	9.17509	0.000289211	1.15709	3060.19	1.04154	0.000311341	8.
0	9.77798	0.0002	1.16666	2653.85	1.06707	0.0003	4.
0	9.25159	0.000217784	1.16867	2761.07	1.05882	0.00027994	8.
0	9.31558	0.000192374	1.17583	2590.28	1.07058	0.000250507	11
0	9.2421	0.0002	1.18328	3138.69	1.09521	0.000298713	16
0	9.46058	0.0002	1.19535	4014.39	1.08923	0.000299903	12
0	9.84542	0.000170258	1.21124	2762.84	1.10133	0.000259569	10
0	9.88953	0.0001	1.24565	2301.62	1.10895	0.000261115	10
0	9.79543	3.7316×10^{-17}	1.33326	2096.42	1.17046	0.000219534	11
0	10.3665	-0.0001	1.38565	1459.35	1.20149	0.000197086	15
0	10.6447	-0.0000202625	1.42488	1521.63	1.249	0.00019499	21
0	11.0094	-0.000170812	1.52758	877.38	1.25044	0.00019959	12
0	10.6745	-0.000251731	1.58235	732.317	1.29309	0.000239853	27
0	10.7469	-0.0003	1.64853	651.392	1.26392	0.000218468	5.
0	10.7814	-0.0004	1.74107	544.541	1.28567	0.000197838	4.
0	10.8189	-0.000360655	1.78279	549.463	1.2648	0.000197531	4.
0	11.1391	-0.0004	1.88248	501.368	1.26012	0.000199833	3.
0	10.4228	-0.000367634	1.93701	526.839	1.24638	0.000197909	2.
0	10.3686	-0.000392187	1.98083	487.758	1.25545	0.000199348	2.
0	10.8504	-0.00039403	2.04639	474.758	1.21646	0.000292834	2.
0	10.8854	-0.00034764	2.0954	536.225	1.20362	0.000291172	2.
0	10.0498	-0.000338405	2.09043	546.708	1.16537	0.000199954	2.
0	10.316	-0.00032714	2.1376	585.452	1.17424	0.000202238	2.
0	10.3999	-0.000224709	2.14397	635.066	1.13638	0.000371759	2.
0	10.128	-0.0002	2.1499	763.433	1.13913	0.000198047	2.
0	9.79401	-0.000172354	2.14064	739.506	1.15203	0.000244782	2.
0	9.75947	-0.000165774	2.15528	828.021	1.11524	0.00029017	2.
0	9.52976	-0.000156777	2.15098	912.409	1.11275	0.000198337	2.

D

In[559]:=
```
Transpose[simParamMedianD] // TableForm
Transpose[simParamQuantile1D] // TableForm
Transpose[simParamQuantile2D] // TableForm
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Out[559]//TableForm=

0	5.1286	0.005	0.238747	37.792	1.00114	0.000321048
0	5.12298	0.003	0.326086	30.3273	1.0014	0.0010148
0	5.16288	0.005	0.368657	26.8765	1.00134	0.002
0	4.90589	0.001	0.747804	11.2971	1.00347	-0.000104706
0	4.81167	0.004	0.63264	20.0344	1.00088	0.00270586
0	5.14147	0.002	0.7785	16.6191	1.00161	0.00248044
0	5.3035	0.000645796	1.13459	12.2616	1.0007	0.0018123
0	5.1021	-2.97717×10^{-16}	1.03445	17.7976	1.0032	0.00210887
0	4.93982	0.00011054	1.22352	17.4748	1.00234	0.00174693
0	4.88525	0.00106465	1.20556	20.571	1.00516	0.00247835
0	5.14446	0.000453752	1.25962	24.3943	1.00453	0.00200618
0	5.20152	0.001	1.31635	28.9013	1.00488	0.00258793
0	5.08654	0.000835117	1.36248	34.1241	1.00618	0.002
0	5.0299	0.000329872	1.3817	38.1205	1.00635	0.00161128
0	5.0394	0.0000574654	1.44231	40.3982	1.00478	0.001
0	4.97559	0.000375962	1.41767	51.9766	1.00738	0.0016793
0	5.37095	0.000734767	1.44082	56.4081	1.00612	0.00131898
0	5.21201	-1.11544×10^{-16}	1.4563	61.4309	1.00815	0.00141542
0	5.14244	0.000569489	1.44475	75.1132	1.02306	0.00197466
0	5.29475	-0.000101411	1.45667	77.6007	1.02241	0.00120864
0	0.166226	0.000874289	1.45035	111.175	1.00351	0.000884899
0	0.180902	0.000855836	1.3612	140.392	1.00738	0.000846568
0	0.176848	0.000834267	1.32006	165.491	1.01248	0.000826623
0	0.180079	0.00080387	1.2654	202.014	1.0305	0.000792086
0	0.177279	0.000776417	1.23741	235.956	1.03923	0.000751309
0	0.173319	0.000662523	1.16542	381.42	1.02506	0.000625589
0	0.178432	0.000648653	1.15714	419.47	1.01877	0.000626037
0	0.170037	0.000593886	1.15024	465.026	1.01653	0.000591731
0	0.170134	0.000562704	1.14926	495.096	1.00519	0.000556238
0	0.183021	0.000549598	1.14377	541.813	1.00626	0.000553057
0	0.175064	0.000513409	1.14227	582.528	1.00909	0.000533162
0	0.177234	0.000479684	1.13931	626.38	1.019	0.000519154
0	0.183873	0.000458831	1.13751	673.286	1.03834	0.000514437
0	0.18413	0.00043264	1.13387	728.901	1.0538	0.000456205
0	0.194676	0.000418752	1.13444	781.63	1.09411	0.000451029
0	0.192948	0.000405017	1.13296	834.184	1.12198	0.000443606
0	0.209783	0.000355741	1.13162	876.164	1.17638	0.000424947
0	0.204789	0.000351945	1.12986	945.211	1.24543	0.000421721
0	0.222282	0.000332058	1.13101	1002.97	1.27675	0.000380243
0	0.233886	0.000313709	1.13058	1052.47	1.34053	0.000361566
0	0.235516	0.000285209	1.13033	1105.62	1.38078	0.000351542
0	0.253311	0.000275012	1.13024	1191.06	1.51334	0.000343426
0	0.260749	0.000262955	1.12857	1290.03	1.53741	0.000339647

0	0.26481	0.000247453	1.1296	1330.32	1.55762	0.000285674
0	0.284417	0.000240859	1.12898	1415.58	1.6505	0.000283507
0	0.297477	0.000224612	1.13126	1470.56	1.71692	0.000272284
0	0.300998	0.000198243	1.1309	1535.73	1.81849	0.000266891
0	0.309264	0.000190817	1.13199	1614.46	1.94738	0.000260071
0	0.335166	0.000185129	1.13359	1692.87	2.06859	0.000254493
0	0.354587	0.000173883	1.13492	1773.71	2.1206	0.000246776
0	0.380899	0.000170704	1.13637	1875.72	2.26616	0.000240004
0	0.404904	0.000163608	1.14088	1941.21	2.44013	0.000230894
0	0.41996	0.000158098	1.14511	2036.13	2.58194	0.000231739
0	0.438446	0.000146622	1.14916	2091.98	2.6865	0.00021752
0	0.492556	0.000129636	1.15502	2075.69	2.99888	0.000185445
0	0.552326	0.000111363	1.16238	2067.29	3.24394	0.000181364
0	0.602759	0.0000885898	1.17428	2008.13	3.77758	0.000175544
0	0.691499	0.0000860003	1.18611	1999.85	4.28125	0.000176029
0	0.815694	0.0000651325	1.20443	1906.7	4.87692	0.00017092
0	1.32978	-0.000104663	1.29625	1293.77	8.28033	0.000150928
0	1.50199	-0.00021015	1.34632	966.54	9.34007	0.000147708
0	1.63547	-0.0003	1.40357	788.405	10.5782	0.000144833
0	1.73213	-0.00037029	1.46192	663.76	10.6053	0.000145326
0	1.84363	-0.000437101	1.53092	578.938	11.071	0.000141974
0	1.90231	-0.000495763	1.61085	508.189	11.34	0.000144141
0	1.91422	-0.000531867	1.68618	463.774	11.5375	0.000140767
0	1.88248	-0.000542764	1.761	439.451	11.1565	0.000141088
0	1.83182	-0.000551748	1.83208	425.405	10.2982	0.000138898
0	1.76996	-0.000544956	1.90028	416.422	9.42854	0.000118983
0	1.67179	-0.000512885	1.95561	425.69	8.62449	0.00011889
0	1.55995	-0.000487935	2.0025	436.008	8.45269	0.000142893
0	1.45973	-0.000451517	2.03608	462.314	7.567	0.000135869
0	1.33003	-0.000416521	2.06412	488.854	7.00426	0.000143604
0	1.2243	-0.000373926	2.08416	528.482	6.60598	0.000153993
0	1.14208	-0.000337695	2.09831	572.392	5.64151	0.000150637
0	1.03683	-0.000307912	2.11155	620.671	5.47303	0.000148384
0	0.983202	-0.000273185	2.1207	674.561	5.18886	0.00013575
0	0.928319	-0.000238901	2.12622	743.894	4.89011	0.0000882825
0	0.879553	-0.000210279	2.12936	819.896	4.35506	0.0000843003

Out[560]//TableForm=

0	4.78233	-0.003	0.161886	6.85306	0.999245	-0.01
0	4.48725	-0.001	0.202756	3.57215	0.999224	-0.004
0	4.65065	-0.002	0.24892	8.51394	0.999759	-0.00539622
0	4.67418	-0.003	0.484239	2.73342	1.00116	-0.01
0	4.44777	-3.60284×10^{-15}	0.407074	5.43926	1.00005	$-2.56538\times10^{-}$
0	4.70725	-0.000726026	0.509524	7.72479	0.99956	-7.2204×10^{-15}
0	4.83972	-0.00379219	0.6519	2.64919	0.99989	-0.006
0	4.66928	-0.00219427	0.82671	5.22474	1.00045	-0.00172479
0	4.56722	-0.002	0.930663	10.2525	1.	-0.001
0	4.50302	-0.00145314	1.09616	13.1879	1.00042	-0.000474263
0	4.59151	-0.00184125	1.12811	16.8874	1.00075	-0.000947637
0	4.86667	-0.000851961	1.15951	23.19	1.00067	$-2.14966\times10^{-}$

0	4.62174	−0.000527505	1.24	27.7714	1.00076	0.000819531
0	4.75077	−0.000848081	1.27705	31.5823	1.00069	2.75306×10^{-15}
0	4.76556	−0.00137673	1.36478	30.7895	1.00049	8.15817×10^{-18}
0	4.43815	−0.001	1.35687	41.6968	1.	0.000309707
0	4.59937	−0.000476184	1.37997	50.4508	1.00053	4.16003×10^{-15}
0	4.72475	−0.000501589	1.39769	53.8072	1.0012	0.000485655
0	4.58164	−0.0000987759	1.41079	65.6995	1.00835	0.000960546
0	4.71048	−0.001	1.41052	63.0068	1.00612	0.000300124
0	0.153584	0.000811957	1.37082	103.662	1.	0.000811957
0	0.159582	0.000820375	1.30525	127.527	1.00481	0.0008
0	0.159921	0.000772346	1.27518	154.41	1.00364	0.000779424
0	0.169742	0.000760101	1.25079	189.018	1.0227	0.000739862
0	0.162758	0.000747019	1.22739	224.86	1.02853	0.000719349
0	0.162049	0.000638536	1.15547	372.635	1.00856	0.0006
0	0.169179	0.000595605	1.15113	409.577	1.00941	0.000574555
0	0.153027	0.000571009	1.14598	445.383	1.00469	0.00055212
0	0.155598	0.000551408	1.14257	482.978	1.00206	0.000544357
0	0.167172	0.000535127	1.13903	535.383	1.00067	0.000529791
0	0.158685	0.000476393	1.13767	565.23	1.00209	0.000507118
0	0.159715	0.000457508	1.13556	611.1	1.00953	0.000482144
0	0.172411	0.000439338	1.13319	659.491	1.02315	0.000466132
0	0.172135	0.000408491	1.13035	707.178	1.03216	0.00043993
0	0.17024	0.000383665	1.12983	760.16	1.05157	0.000435342
0	0.182621	0.000365327	1.12809	816.696	1.07634	0.000428265
0	0.190879	0.000344685	1.12884	857.391	1.13557	0.000388661
0	0.188425	0.000337904	1.12662	923.72	1.17401	0.000386596
0	0.203073	0.00031519	1.12813	977.129	1.24441	0.000361905
0	0.220516	0.000301765	1.12665	1026.49	1.27945	0.000351516
0	0.218874	0.000262103	1.12664	1074.31	1.31856	0.000341197
0	0.216595	0.000262346	1.12593	1152.43	1.38352	0.000327049
0	0.232921	0.000249816	1.12546	1222.95	1.43535	0.000292665
0	0.249603	0.00022746	1.12662	1279.16	1.41658	0.000274454
0	0.264286	0.000228958	1.12477	1376.08	1.56639	0.000273131
0	0.270017	0.000192191	1.12783	1414.12	1.65129	0.000267445
0	0.276167	0.000189037	1.12787	1455.55	1.68055	0.000256752
0	0.285753	0.000183592	1.1285	1558.2	1.85723	0.000249561
0	0.310695	0.000172531	1.13018	1655.29	1.91122	0.000245178
0	0.329565	0.000166379	1.13103	1729.31	1.95879	0.000241014
0	0.360748	0.0001634	1.13397	1810.46	2.10299	0.00023091
0	0.359902	0.000139912	1.13632	1825.11	2.18769	0.000196466
0	0.395687	0.000141845	1.14155	1937.89	2.42899	0.000197098
0	0.423004	0.000126357	1.14648	1908.29	2.48489	0.000188183
0	0.459851	0.000100352	1.15156	1961.54	2.80348	0.000179985
0	0.521551	0.0000928566	1.15964	1913.85	3.01038	0.000175115
0	0.572065	0.0000770371	1.16968	1880.91	3.43118	0.000168188
0	0.658143	0.0000774912	1.18375	1934.58	4.0859	0.000171043
0	0.756337	0.0000518247	1.19969	1783.43	4.49685	0.000164504
0	1.27776	−0.000132211	1.29118	1190.88	7.46276	0.00014291
0	1.42322	−0.000234742	1.3395	897.545	8.82755	0.000140277
0	1.5737	−0.000329905	1.39701	739.086	9.5371	0.000135872
0	1.68578	−0.000396204	1.45628	640.413	9.5265	0.000133778
0	1.77799	−0.000475583	1.52403	553.718	10.2381	0.00013498
0	1.83794	−0.000506298	1.59985	495.05	10.444	0.00013353
0	1.84079	−0.000552621	1.67861	456.365	10.495	0.000120946
0	1.84801	−0.000560376	1.75652	433.759	10.0705	0.0000948519
0	1.77154	−0.000564425	1.82611	416.498	9.54359	0.0000956859
0	1.71494	−0.000558714	1.89162	410.217	8.65491	0.0000904891
0	1.60794	−0.000531295	1.94956	419.136	7.94447	0.0000907401
0	1.5221	−0.000507082	1.99791	428.839	7.26776	0.0000914475
0	1.38257	−0.000464643	2.0311	455.386	6.99723	0.0000900175
0	1.27531	−0.00042741	2.05699	483.457	6.65246	0.000093681
0	1.18393	−0.000380836	2.07921	521.005	5.65398	0.000133161
0	1.09537	−0.000358515	2.09378	565.832	4.99573	0.0000924781
0	1.00318	−0.000316297	2.10723	612.754	4.84123	0.0000891494

0	0.935909	-0.000281381	2.1163	668.007	4.71154	0.0000868105
0	0.877099	-0.000249353	2.12282	731.437	4.3755	0.0000841013
0	0.838328	-0.000218973	2.12546	803.933	4.15189	0.0000800901

Out[561]//TableForm=

0	5.67007	0.015	0.756209	142.576	1.00715	0.01
0	5.62691	0.00880785	1.11649	111.964	1.00754	0.006
0	5.66228	0.0106983	0.83742	62.6541	1.00776	0.007
0	5.58715	0.00651116	1.82348	23.7001	1.01232	0.007
0	5.13914	0.007	1.84885	45.5765	1.00537	0.007
0	5.56892	0.005	1.43526	33.6667	1.0054	0.00503102
0	5.74671	0.006	3.78592	28.9529	1.00656	0.005
0	5.53882	0.003	2.73633	25.0151	1.00791	0.005
0	5.47524	0.00427212	1.78559	32.3647	1.00964	0.00471095
0	5.67716	0.003	1.65096	28.7479	1.01301	0.004
0	5.72204	0.00210972	1.56185	33.2984	1.00869	0.004
0	5.61712	0.0025187	1.50129	40.4423	1.01239	0.004
0	5.49931	0.002	1.46377	42.7378	1.01882	0.00372655
0	5.45873	0.002	1.49015	46.9755	1.01879	0.00318141
0	5.61958	0.0014144	1.63507	48.5806	1.0165	0.00290938
0	5.32614	0.00174664	1.49049	58.8003	1.02036	0.00298828
0	5.65898	0.00148061	1.48429	64.7573	1.01714	0.0028816
0	5.74577	0.001	1.50604	77.1911	1.0178	0.00207633
0	5.72134	0.00148865	1.48756	87.6987	1.04571	0.00288932
0	5.67869	0.00091633	1.50428	90.8891	1.05411	0.00224217
0	0.189664	0.000972681	1.50756	122.539	1.00602	0.000968459
0	0.190664	0.000895582	1.43513	149.577	1.0118	0.000887096
0	0.19034	0.000888136	1.36374	178.026	1.02033	0.000886345
0	0.19588	0.000857582	1.301	208.751	1.03996	0.000836964
0	0.197886	0.000828424	1.25844	243.567	1.05127	0.0007906
0	0.186557	0.000698587	1.17169	397.166	1.04495	0.000679925
0	0.192388	0.000663169	1.16494	432.985	1.03966	0.000654803
0	0.178126	0.000643833	1.15993	471.507	1.02238	0.000624732
0	0.191137	0.000580543	1.15672	512.815	1.01399	0.000579093
0	0.195912	0.000567125	1.15136	556.618	1.0153	0.000581829
0	0.186973	0.00053866	1.14606	596.739	1.01788	0.00055302
0	0.189029	0.000519303	1.14417	651.11	1.03088	0.000541599
0	0.201922	0.000500381	1.14224	694.424	1.0645	0.000537903
0	0.206294	0.00044383	1.13952	740.144	1.08996	0.000502179
0	0.217477	0.000434642	1.13813	801.202	1.12853	0.000473864
0	0.208686	0.000418135	1.13582	867.058	1.19187	0.000457619
0	0.2196	0.000369478	1.13574	897.525	1.22436	0.000440544
0	0.225524	0.000372423	1.13309	970.394	1.29386	0.000431468
0	0.237004	0.00034999	1.13457	1020.01	1.38732	0.000422638
0	0.249942	0.000338898	1.13384	1102.31	1.41247	0.000389589
0	0.252739	0.000313202	1.13422	1152.76	1.49174	0.000361735
0	0.282464	0.000286308	1.13339	1228.47	1.57831	0.000355662
0	0.285314	0.000282483	1.13167	1332.7	1.61005	0.000351481
0	0.28944	0.000252448	1.1316	1367.46	1.70462	0.000317825
0	0.30144	0.000247896	1.13145	1454.9	1.79254	0.000290516

0	0.31963	0.000237537	1.13502	1541.42	1.90265	0.000278345
0	0.333248	0.000227435	1.13444	1602.27	1.92928	0.000276572
0	0.334908	0.000209903	1.135	1686.1	2.03553	0.000269397
0	0.358806	0.000196298	1.13531	1761.22	2.24202	0.000263716
0	0.377224	0.000185368	1.1376	1819.09	2.32177	0.000254987
0	0.400034	0.000178487	1.13838	1935.63	2.46547	0.000251564
0	0.43468	0.000170806	1.14593	1998.71	2.69415	0.000250043
0	0.452937	0.000170027	1.14782	2114.45	2.77716	0.000240281
0	0.477355	0.00016198	1.15131	2177.85	2.98864	0.000236731
0	0.512325	0.000146407	1.15951	2202.26	3.16318	0.000217881
0	0.574247	0.000131324	1.16764	2215.56	3.51959	0.000193896
0	0.648416	0.0001	1.17749	2100.71	4.03082	0.000181701
0	0.729092	0.0000963371	1.18939	2105.72	4.55712	0.000181763
0	0.862015	0.0000868425	1.20651	2046.2	5.4805	0.000176961
0	1.39227	-0.0000855975	1.30261	1365.34	8.93568	0.000156109
0	1.5598	-0.000175967	1.35286	1023.18	9.98781	0.00015443
0	1.71391	-0.000266294	1.40929	835.382	11.437	0.000150128
0	1.78528	-0.000340763	1.46813	692.074	12.1308	0.000155409
0	1.87813	-0.000425664	1.53737	592.378	11.8565	0.000146921
0	1.9453	-0.000469213	1.61627	526.534	12.0768	0.00015101
0	2.00682	-0.000513897	1.69134	478.593	12.1393	0.000147276
0	1.94971	-0.000519435	1.76814	452.023	12.1203	0.00014694
0	1.92861	-0.000530086	1.84163	434.107	11.4477	0.00015292
0	1.82152	-0.000516136	1.90822	428.757	10.3883	0.000147847
0	1.73785	-0.0005	1.96268	433.857	9.32748	0.000150074
0	1.64869	-0.000474801	2.00959	444.525	9.21034	0.000161872
0	1.49912	-0.000437726	2.04333	467.954	8.32668	0.000160666
0	1.4154	-0.0004	2.06862	497.913	7.65689	0.000164149
0	1.30394	-0.000361237	2.09037	533.883	7.34838	0.000196148
0	1.18932	-0.000328173	2.1034	577.683	6.59658	0.00019617
0	1.07795	-0.00029697	2.11567	628.453	6.42279	0.00019554
0	1.02903	-0.000261238	2.12429	685.299	5.69808	0.000195139
0	0.969232	-0.000226768	2.12977	759.254	5.30481	0.000152418
0	0.934932	-0.0002	2.13321	832.952	4.84516	0.000125522

Nv

In[562]:=
```
Transpose[simParamNv] // TableForm
```

Out[562]//TableForm=

1.15733×10^{-8}	4.0267×10^{-7}	0.0000966667	0.00123275	0.00248568	0.0161
1.36603×10^{-8}	4.75641×10^{-7}	0.000113574	0.00145309	0.00294378	0.0192
1.61585×10^{-8}	5.62982×10^{-7}	0.00013369	0.00171672	0.00349541	0.0236
1.91541×10^{-8}	6.67678×10^{-7}	0.000157653	0.002033	0.00416181	0.0277
2.27515×10^{-8}	7.93362×10^{-7}	0.000186231	0.00241195	0.00496538	0.0333
2.70794×10^{-8}	9.44469×10^{-7}	0.000220353	0.0028678	0.00593932	0.0402
3.22924×10^{-8}	1.12638×10^{-6}	0.000261138	0.00341649	0.00712029	0.0486
3.8584×10^{-8}	1.34568×10^{-6}	0.00030993	0.00407776	0.00855423	0.0589
4.6185×10^{-8}	1.61037×10^{-6}	0.000368409	0.00487674	0.0103004	0.0715
5.53825×10^{-8}	1.93026×10^{-6}	0.000438459	0.00584061	0.0124224	0.0869
6.65265×10^{-8}	2.31733×10^{-6}	0.000522487	0.00700568	0.0150063	0.1057
8.0047×10^{-8}	2.78616×10^{-6}	0.000623358	0.008415	0.0181546	0.1285
9.64718×10^{-8}	3.35468×10^{-6}	0.00074451	0.0101207	0.0219924	0.1564
1.16446×10^{-7}	4.04476×10^{-6}	0.000890108	0.0121862	0.0266707	0.1906
1.40771×10^{-7}	4.8832×10^{-6}	0.00106515	0.0146874	0.0323722	0.2306
1.70432×10^{-7}	5.90282×10^{-6}	0.00127565	0.0177166	0.0393137	0.2791
2.06623×10^{-7}	7.14384×10^{-6}	0.00152887	0.02138	0.0477538	0.3368
2.50828×10^{-7}	8.6555×10^{-6}	0.00183358	0.0258188	0.0580013	0.4043
3.04889×10^{-7}	0.0000104981	0.00220008	0.0311761	0.0704066	0.4826
3.71048×10^{-7}	0.0000127456	0.00264087	0.037646	0.0853945	0.5717

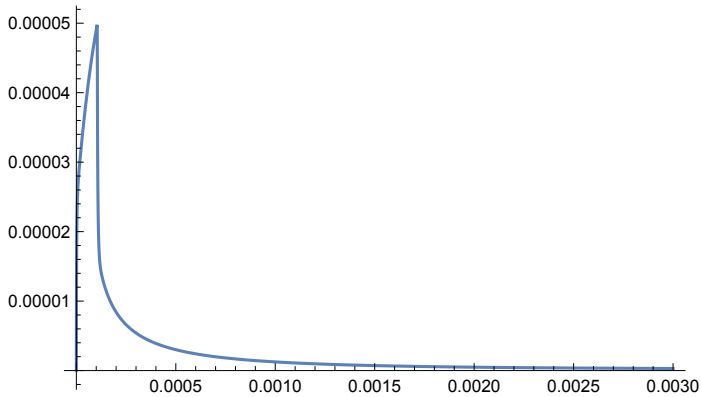
4.52087×10^{-7}	0.0000154887	0.00317106	0.0454358	0.103402	0.6712
5.51515×10^{-7}	0.0000188402	0.00380876	0.0547828	0.124933	0.7795
6.73435×10^{-7}	0.0000229334	0.00457485	0.0659997	0.150568	0.8942
8.23128×10^{-7}	0.0000279364	0.00549493	0.0793975	0.180851	1.0118
1.00705×10^{-6}	0.0000340538	0.0065991	0.0953362	0.216331	1.1278
1.23271×10^{-6}	0.0000415269	0.00792271	0.114215	0.2575	1.2379
1.51076×10^{-6}	0.0000506792	0.00950828	0.136437	0.3047	1.3381
1.85299×10^{-6}	0.0000618782	0.011405	0.16243	0.358106	1.4258
2.27491×10^{-6}	0.000075592	0.0136711	0.192618	0.417598	1.5005
2.79416×10^{-6}	0.000092366	0.0163731	0.227351	0.482675	1.5630
3.43405×10^{-6}	0.000112893	0.0195898	0.266928	0.552402	1.6156
4.2229×10^{-6}	0.000138012	0.0234114	0.311514	0.625368	1.6606
5.19566×10^{-6}	0.000168745	0.0279413	0.361096	0.699706	1.6999
6.396×10^{-6}	0.000206353	0.0332944	0.415487	0.773206	1.7349
7.87629×10^{-6}	0.000252322	0.0396084	0.474067	0.843426	1.7663
9.7028×10^{-6}	0.000308513	0.0470344	0.536042	0.908063	1.7948
0.0000119401	0.000376864	0.0557224	0.600268	0.965201	1.8207
0.0000147188	0.000460654	0.0658686	0.66532	1.01356	1.8443
0.000018148	0.00056291	0.0776616	0.729523	1.05269	1.8660
0.0000223798	0.000687618	0.0913074	0.791128	1.08299	1.8861
0.0000466775	0.00129019	0.14679	0.952943	1.13109	1.9309
0.0000556452	0.00152296	0.165924	0.981202	1.13848	1.9431
0.0000663293	0.00179676	0.187011	1.00504	1.14443	1.9547
0.0000790559	0.00211853	0.210131	1.02468	1.14939	1.9659
0.0000942108	0.00249633	0.235345	1.04046	1.15367	1.9766
0.000112251	0.00293946	0.262685	1.05286	1.15747	1.9869
0.000133773	0.003459	0.292186	1.06244	1.16093	1.9968
0.000159319	0.00406688	0.323735	1.06974	1.16413	2.0064
0.000189686	0.00477719	0.357274	1.0753	1.16712	2.0157
0.000225804	0.0056069	0.392632	1.07957	1.16993	2.0248
0.000268639	0.00657307	0.429683	1.08294	1.1726	2.0336
0.0003196	0.00769884	0.468155	1.08569	1.17514	2.0423
0.000379791	0.00900446	0.507727	1.08802	1.17759	2.0509
0.000451019	0.0105172	0.54805	1.09009	1.17996	2.0594
0.000535902	0.0122755	0.588756	1.09199	1.18227	2.0679
0.000636003	0.0143037	0.629374	1.09378	1.18457	2.0765
0.000754485	0.0166443	0.669466	1.0955	1.18688	2.0854
0.000894426	0.0193383	0.708564	1.09718	1.18924	2.0945
0.00105954	0.022432	0.746217	1.09887	1.19169	2.1042
0.0012543	0.0259778	0.782003	1.10058	1.19429	2.1145
0.00148377	0.0300311	0.815544	1.10236	1.19711	2.1257
0.0017537	0.0346521	0.84653	1.10424	1.20024	2.1381
0.00207114	0.0399062	0.874725	1.10628	1.20377	2.1526
0.00244325	0.0458625	0.899985	1.10853	1.20783	2.1679
0.00287964	0.0525948	0.922256	1.11107	1.21258	2.1863
0.00338993	0.0601765	0.941574	1.11399	1.21821	2.2079
0.00398697	0.0686945	0.958064	1.1174	1.22495	2.2334
0.00468311	0.0782209	0.971924	1.12144	1.23309	2.2638
0.00549503	0.0888461	0.983404	1.12628	1.24296	2.3
0.00643815	0.100639	0.992799	1.13213	1.255	2.3433
0.00753612	0.1137	1.00043	1.13924	1.26964	2.3949
0.00880326	0.12806	1.00662	1.1479	1.2875	2.4565
0.0102684	0.143793	1.01169	1.15849	1.30911	2.5288
0.0119635	0.160989	1.01594	1.17143	1.33522	2.6135
0.0329205	0.318746	1.03695	1.24341	1.45782	2.9534
0.0366252	0.340629	1.04083	1.26956	1.50397	3.0786
0.0406904	0.363175	1.04527	1.29994	1.55538	3.2118
0.045146	0.386331	1.05039	1.33494	1.61159	3.3505
0.0500107	0.409978	1.05634	1.37484	1.67167	3.4926
0.0553196	0.43407	1.06324	1.4198	1.73425	3.6335
0.0610851	0.458482	1.07127	1.46972	1.79768	3.7725

0.0673514	0.483155	1.08061	1.52424	1.85979	3.9061
0.0741357	0.507977	1.09144	1.5826	1.91864	4.0326
0.0814677	0.532856	1.104	1.64369	1.97223	4.1498
0.0893667	0.557707	1.11852	1.70596	2.01948	4.2574
0.0978583	0.582442	1.13524	1.76761	2.05978	4.3546
0.106964	0.606994	1.15443	1.82664	2.09338	4.4415
0.116693	0.631264	1.17636	1.88108	2.12109	4.5182
0.127069	0.655226	1.20128	1.92935	2.14405	4.5855
0.1381	0.678824	1.22944	1.9704	2.16333	4.6440
0.149788	0.70204	1.26102	2.00388	2.17981	4.6947
0.162142	0.724865	1.29617	2.03025	2.19411	4.7383
0.175166	0.747319	1.33495	2.05046	2.20663	4.7757
0.188836	0.769426	1.37729	2.06583	2.21762	4.8077

EPSC with different caRest

In[563]:=
```
locaCa = Transpose[{dataLocalCaTime, dataLocalCa}];
locaCaWithoutdublictes = Mean /@ GatherBy[locaCa, First];
interpolFunc = Interpolation[locaCaWithoutdublictes, InterpolationOrder → 1];
caFunc[t_] := interpolFunc[t];
Plot[caFunc[t], {t, 0.00, 0.003}, PlotRange → All]
```

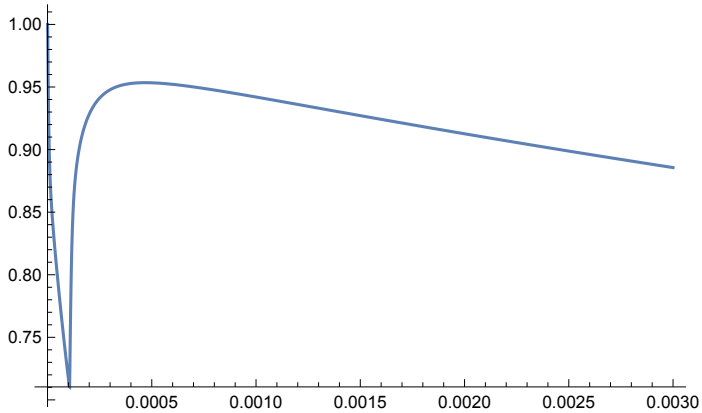
Out[567]=



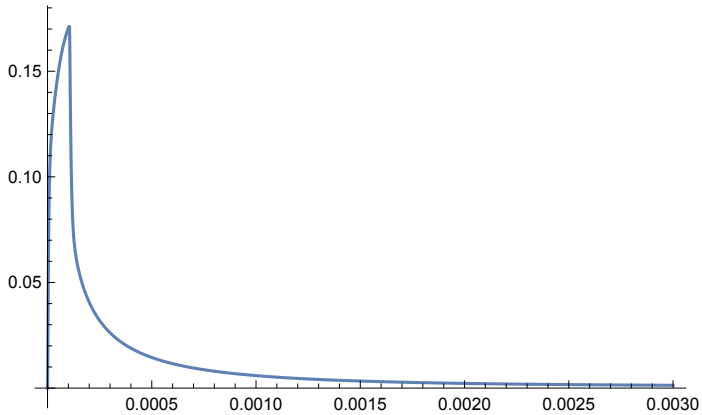
NDSolve

In[568]:=
```
timeStartForPLot = 0.0;
timeEndForPLot = 0.003;
myNDSolveResults = NDSolve[eq, {ss1A, ss2A, ss3A, ss4A, ss5A, ss6A,
    ss7A, ss1B, ss2B, ss3B, ss4B, ss5B, ss6B, ss7B}, {t, 0, 0.003}];
Plot[(ss1A[t] /. myNDSolveResults), {t, timeStartForPLot, timeEndForPLot},
 PlotRange → All]
Plot[(ss2A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss3A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss4A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss5A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss6A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss7A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss1B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss2B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss3B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss4B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss5B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss6B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss7B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
```

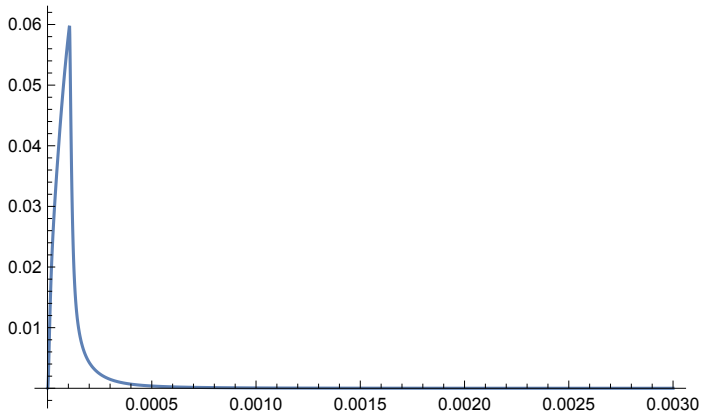
Out[571]=



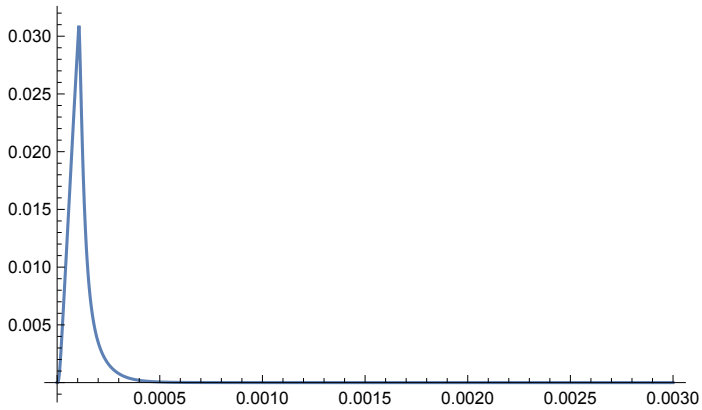
Out[572]=



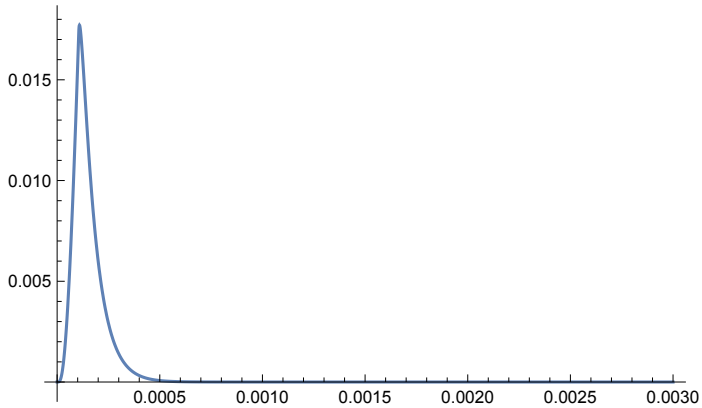
Out[573]=



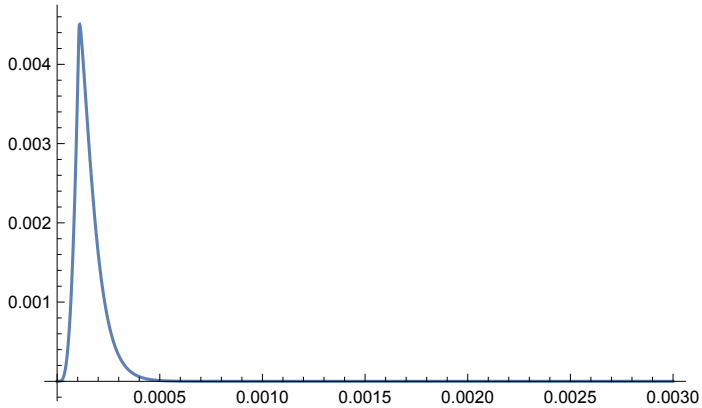
Out[574]=



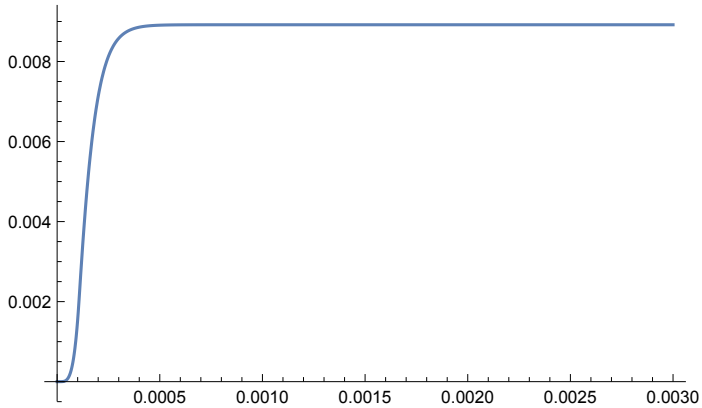
Out[575]=



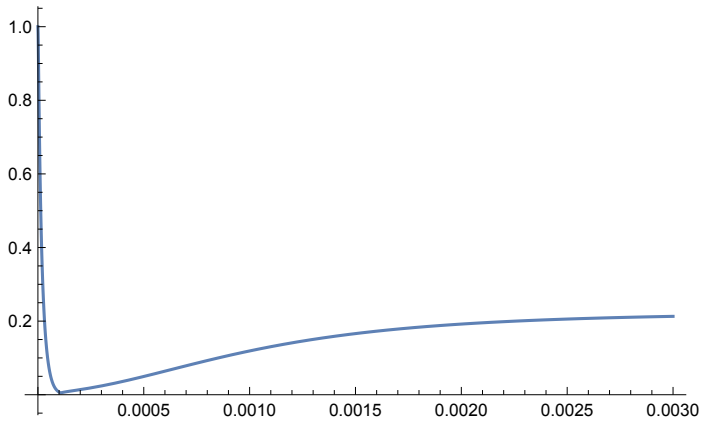
Out[576]=



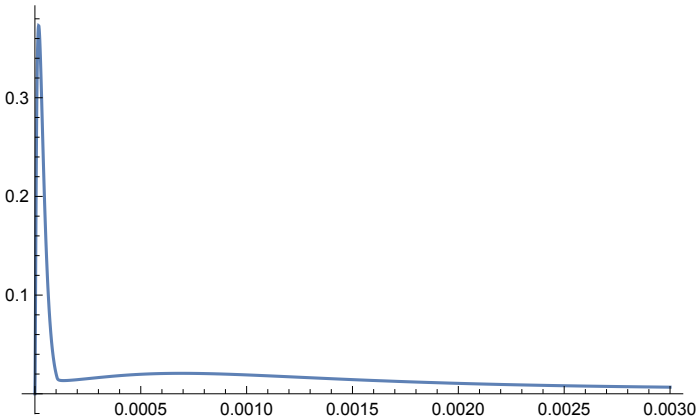
Out[577]=



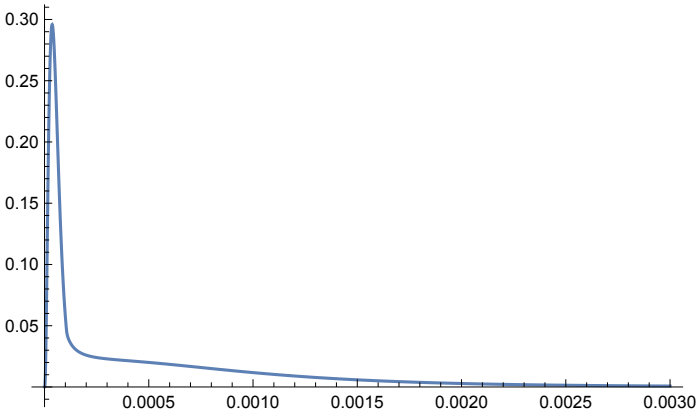
Out[578]=



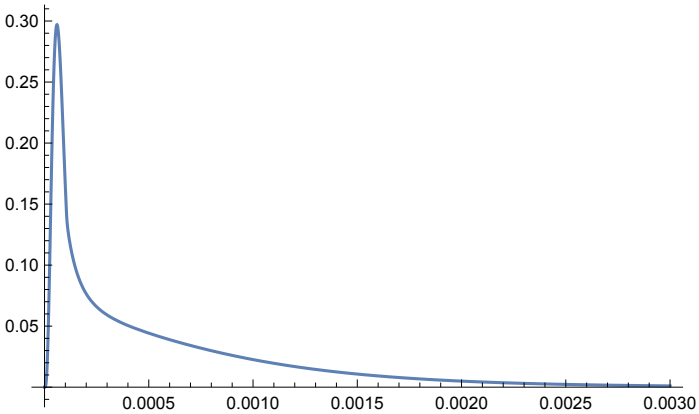
Out[579]=



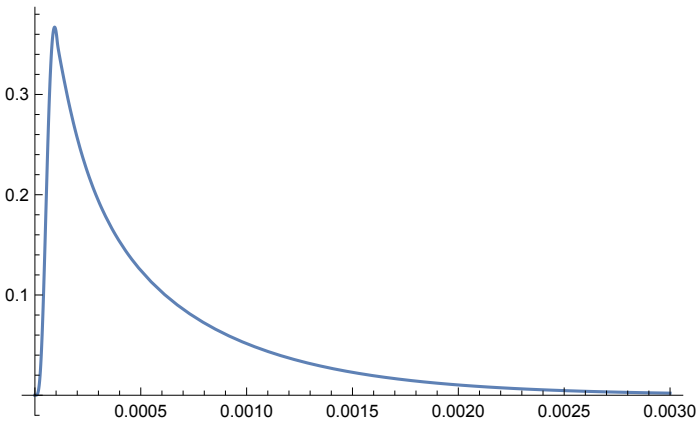
Out[580]=



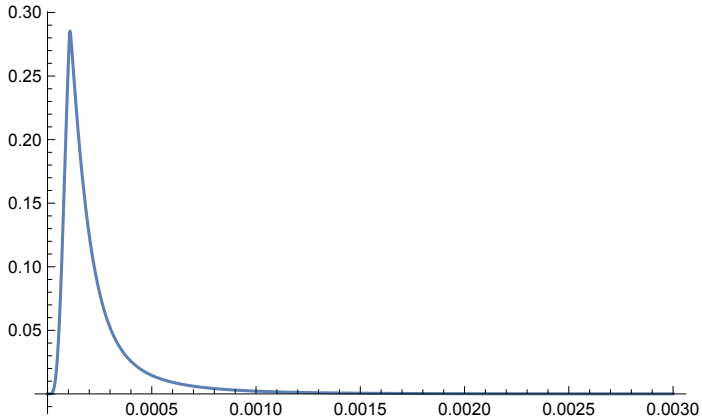
Out[581]=



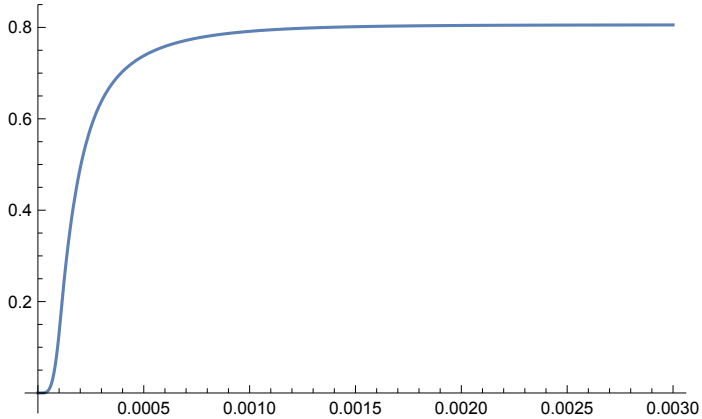
Out[582]=



Out[583]=



Out[584]=



different caRest

In[585]:=
```
caRestLow = 30*^-9;
caRestHigh = 180*^-9;
```

Low Ca

Initial occupancy

In[587]:=
```
(*calualte initial equilibrium occupancy*)
caFunc[t_] := caRestLow;
ss0AInitial = kprimSchemeA / kunprimSchemeA
ss0BInitial = (kprimSchemeA / kunprimSchemeA) * (kprimSchemeB / kunprimSchemeB)
```

Out[588]= 1.

Out[589]= 0.26514

Diff eq.

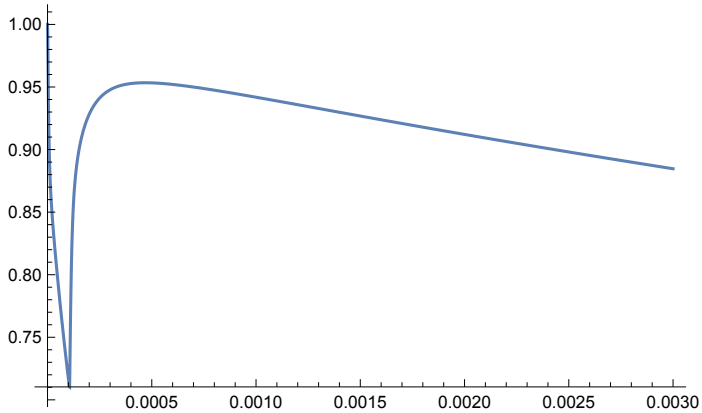
In[590]:=
```
Clear[caFunc, eq];(*Clear is needed if the cell is exectued for a 2nd time
 when caFunc is already set to a value or an Interpolationfunction*)
caFunc[t_] := interpolFunc[t];
ssA[t_] = {ss1A[t], ss2A[t], ss3A[t], ss4A[t], ss5A[t], ss6A[t], ss7A[t]};
ssB[t_] = {ss1B[t], ss2B[t], ss3B[t], ss4B[t], ss5B[t], ss6B[t], ss7B[t]};
eq = {
   ssA'[t] == (matA /. repl).ssA[t],
   ssA[0] == {ss0AInitial, 0, 0, 0, 0, 0, 0},

   ssB'[t] == (matB /. repl).ssB[t],
   ssB[0] == {ss0BInitial, 0, 0, 0, 0, 0, 0}
  };
```

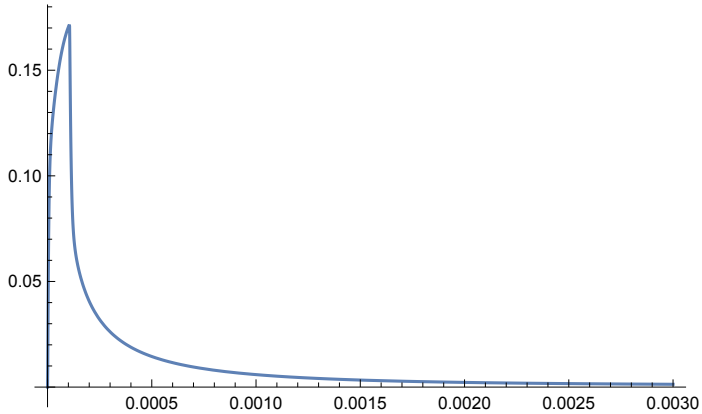
NDSolve

In[595]:=
```
myNDSolveResults = NDSolve[eq, {ss1A, ss2A, ss3A, ss4A, ss5A, ss6A,
    ss7A, ss1B, ss2B, ss3B, ss4B, ss5B, ss6B, ss7B}, {t, 0, 0.003}];
Plot[(ss1A[t] /. myNDSolveResults), {t, timeStartForPLot, timeEndForPLot},
 PlotRange → All]
Plot[(ss2A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss3A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss4A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss5A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss6A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss7A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Print["-----------------------------------------------------------------"];
Plot[(ss1B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss2B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss3B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss4B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss5B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss6B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss7B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
```

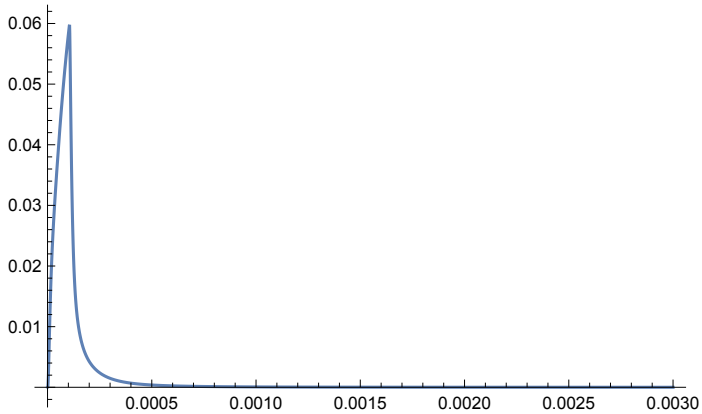
Out[596]=



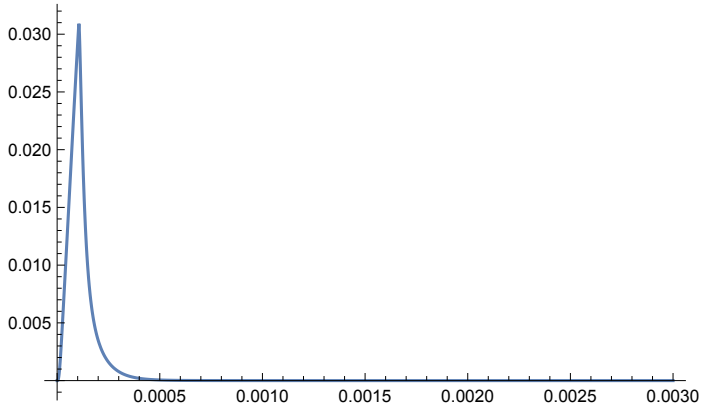
Out[597]=



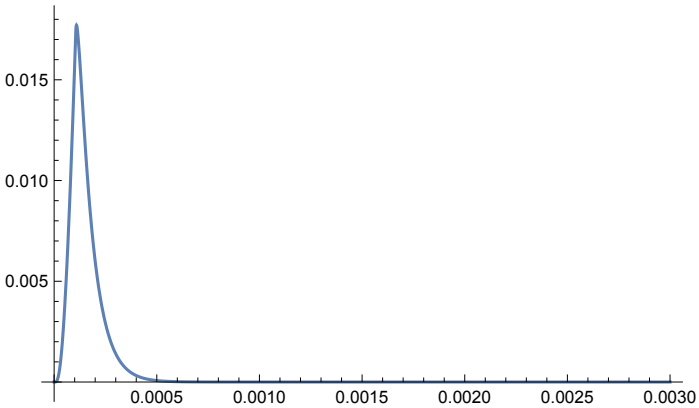
Out[598]=



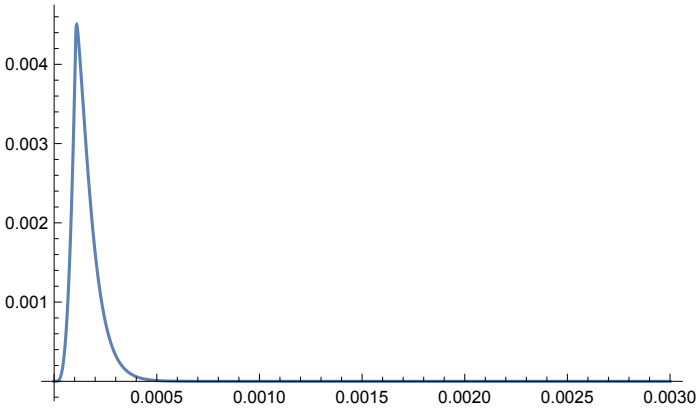
Out[599]=



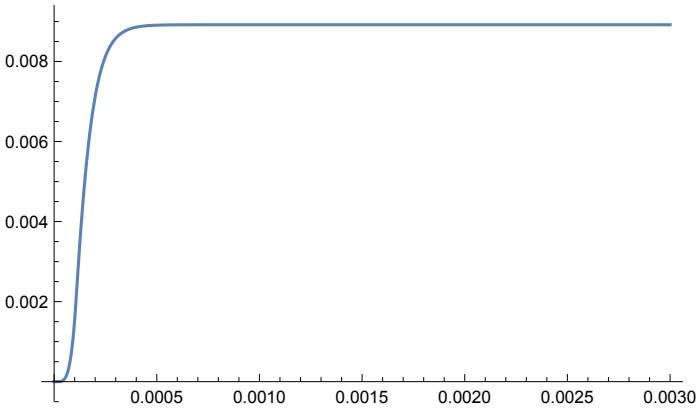
Out[600]=



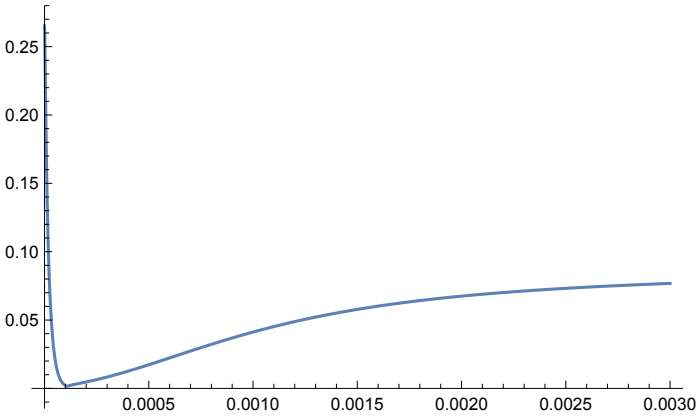
Out[601]=



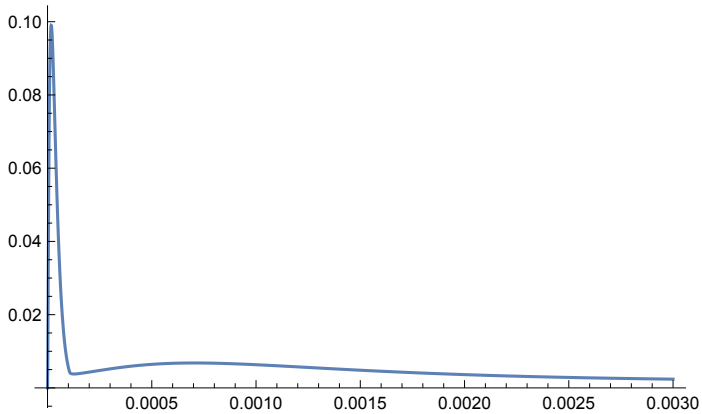
Out[602]=



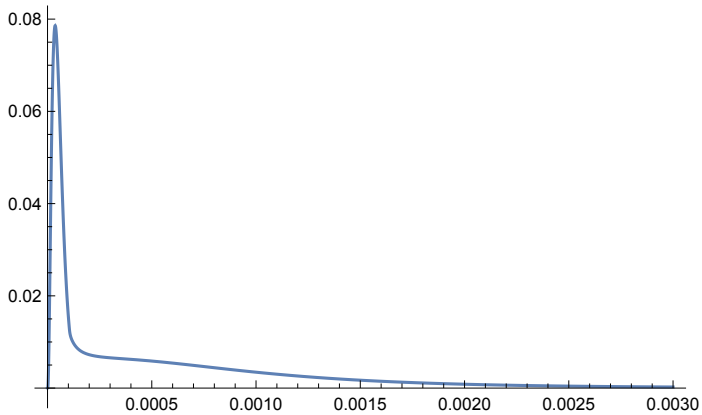
Out[604]=



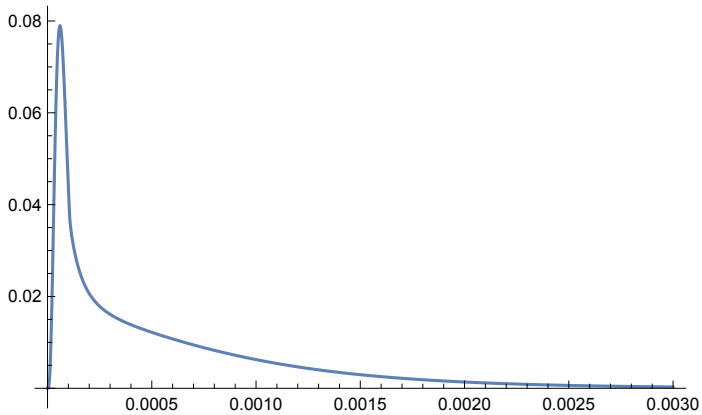
Out[605]=



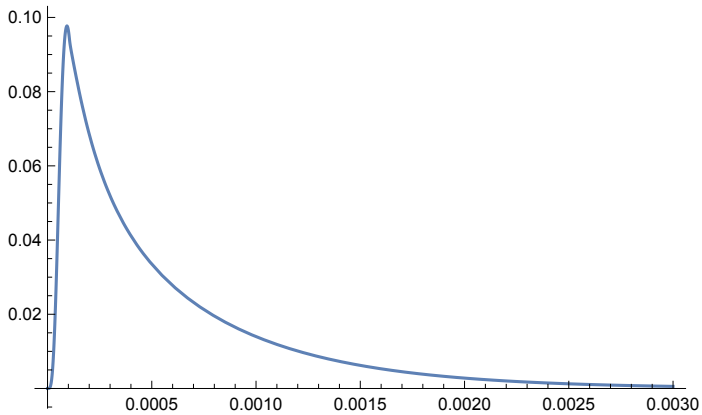
Out[606]=



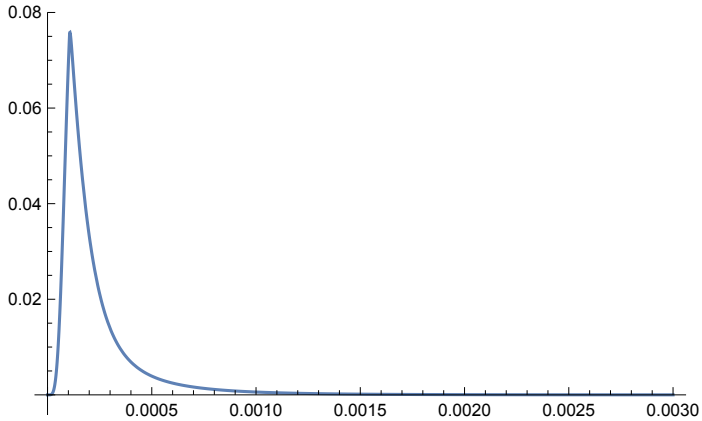
Out[607]=



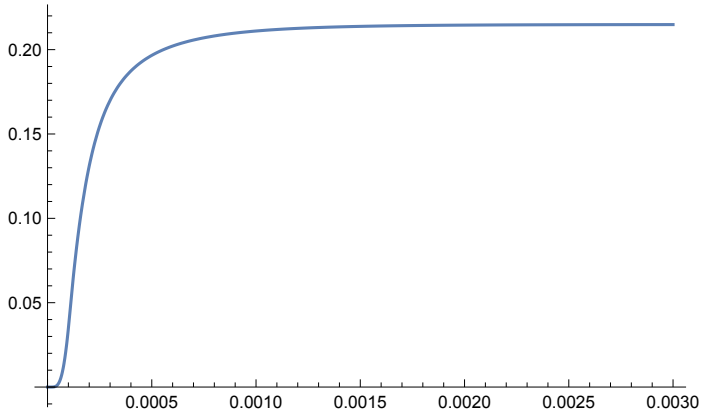
Out[608]=



Out[609]=



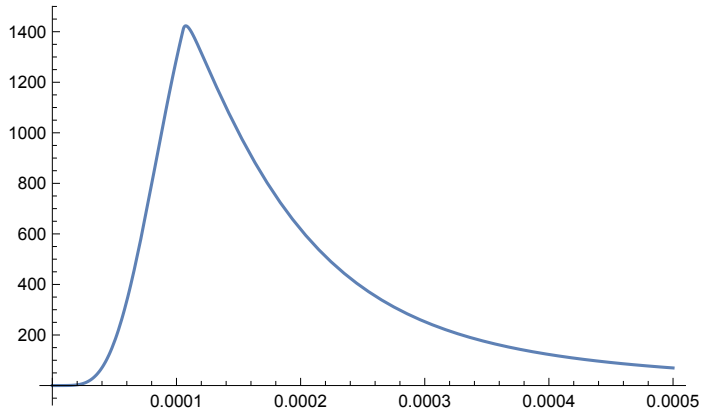
Out[610]=



Plot EPSC

In[611]:=
```
epscLowCa = D[((ss7A[t] + ss7B[t]) /. myNDSolveResults), t];
Plot[epscLowCa, {t, 0, 2.*^-3}, PlotRange → All];
Plot[epscLowCa, {t, 0, 0.5*^-3}, PlotRange → All]
```

Out[613]=



High Ca

Initial occupancy

In[614]:=
```
(*calualte initial equilibrium occupancy*)
caFunc[t_] := caRestHigh;
ss0AInitial = kprimSchemeA / kunprimSchemeA
ss0BInitial = (kprimSchemeA / kunprimSchemeA) * (kprimSchemeB / kunprimSchemeB)
```

Out[615]= 1.

Out[616]= 0.836742

Diff eq.

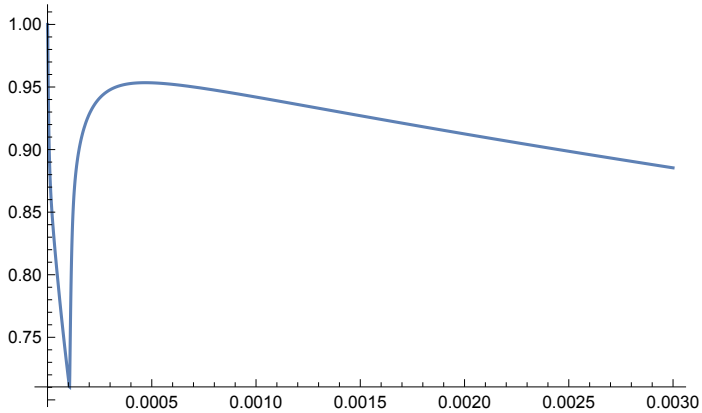
In[617]:=
```
Clear[caFunc, eq];(*Clear is needed if the cell is exectued for a 2nd time
 when caFunc is already set to a value or an Interpolationfunction*)
caFunc[t_] := interpolFunc[t];
ssA[t_] = {ss1A[t], ss2A[t], ss3A[t], ss4A[t], ss5A[t], ss6A[t], ss7A[t]};
ssB[t_] = {ss1B[t], ss2B[t], ss3B[t], ss4B[t], ss5B[t], ss6B[t], ss7B[t]};
eq = {
   ssA'[t] == (matA /. repl).ssA[t],
   ssA[0] == {ss0AInitial, 0, 0, 0, 0, 0, 0},

   ssB'[t] == (matB /. repl).ssB[t],
   ssB[0] == {ss0BInitial, 0, 0, 0, 0, 0, 0}
  };
```

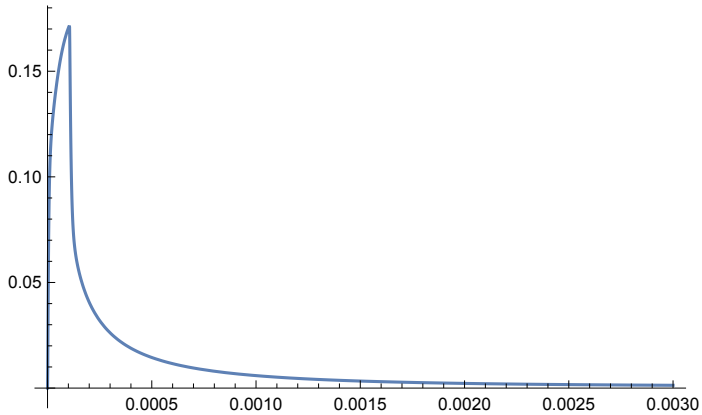
NDSolve

In[622]:=
```
myNDSolveResults = NDSolve[eq, {ss1A, ss2A, ss3A, ss4A, ss5A, ss6A,
    ss7A, ss1B, ss2B, ss3B, ss4B, ss5B, ss6B, ss7B}, {t, 0, 0.003}];
Plot[(ss1A[t] /. myNDSolveResults), {t, timeStartForPLot, timeEndForPLot},
 PlotRange → All]
Plot[(ss2A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss3A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss4A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss5A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss6A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss7A[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Print["-----------------------------------------------------------------"];
Plot[(ss1B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss2B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss3B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss4B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss5B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss6B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
Plot[(ss7B[t] /. myNDSolveResults),
 {t, timeStartForPLot, timeEndForPLot}, PlotRange → All]
```

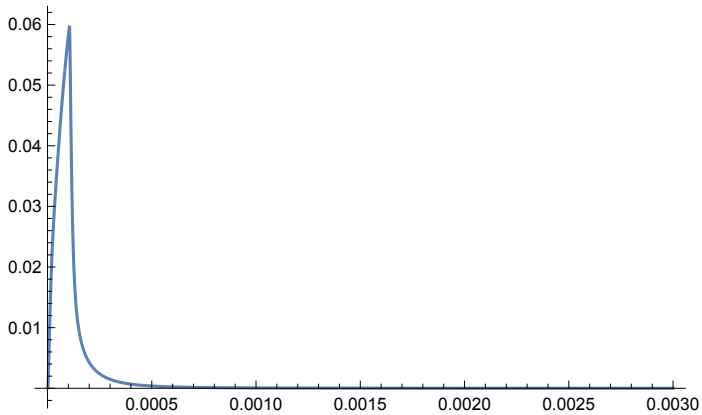
Out[623]=



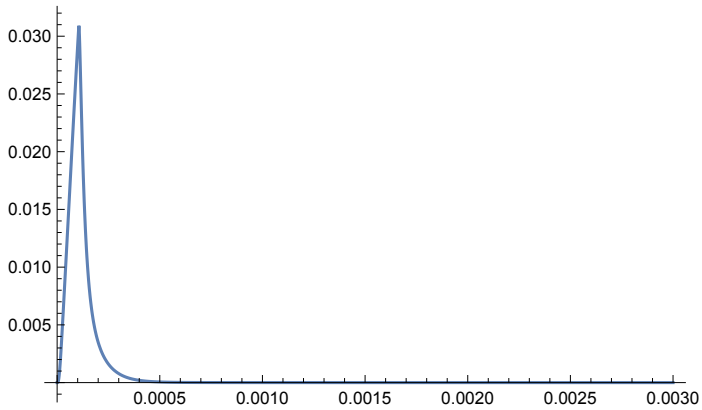
Out[624]=



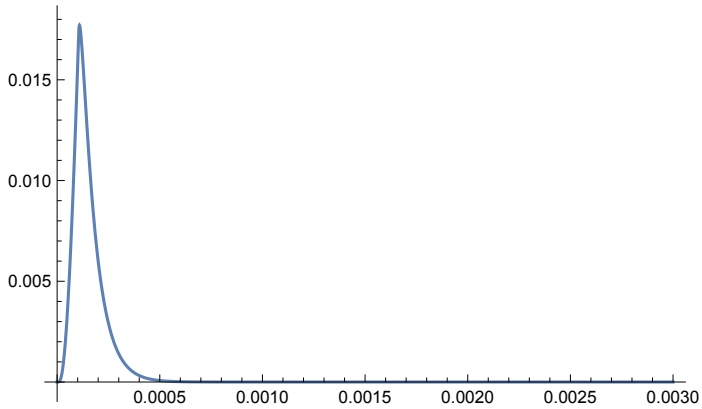
Out[625]=



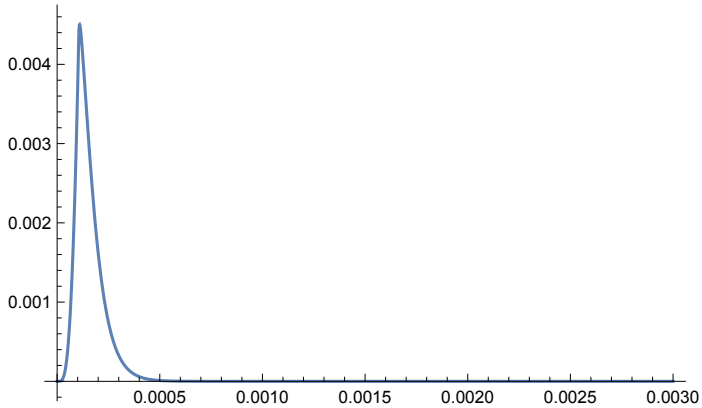
Out[626]=



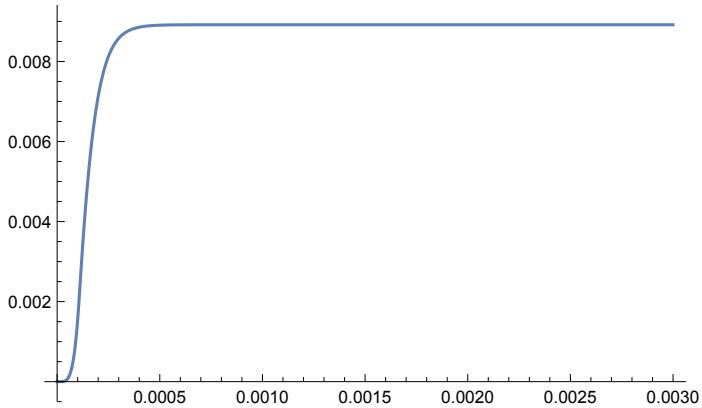
Out[627]=



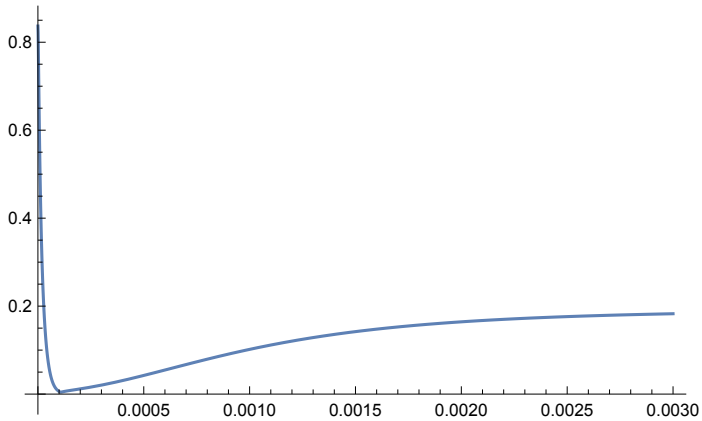
Out[628]=



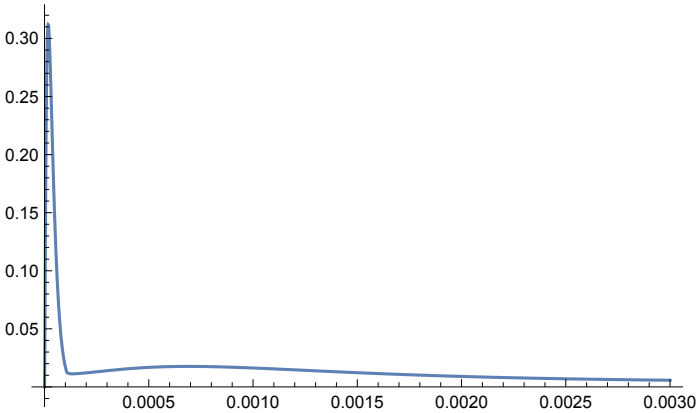
Out[629]=



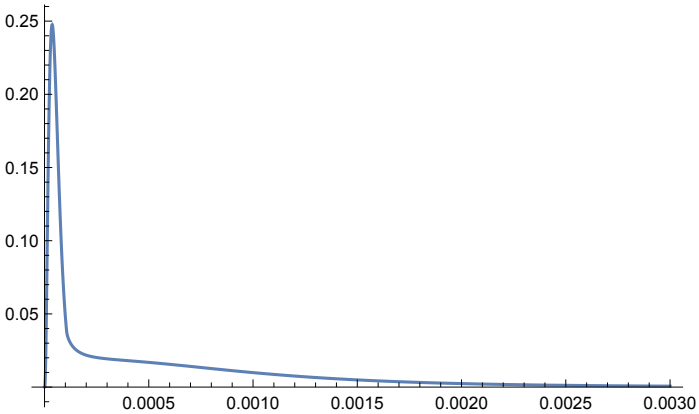
Out[631]=



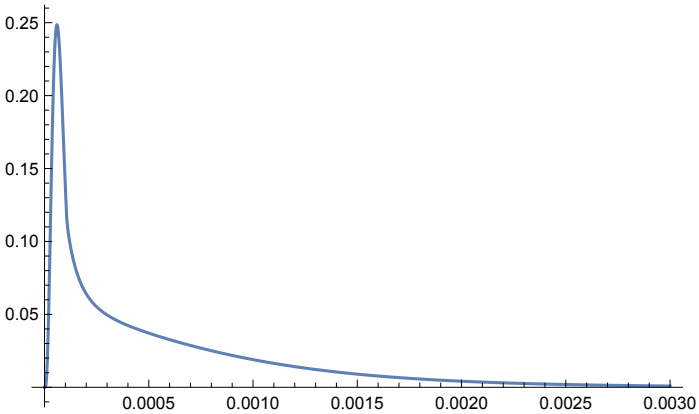
Out[632]=



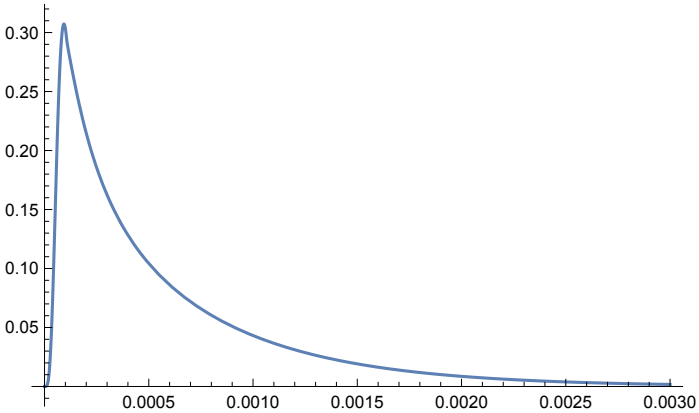
Out[633]=



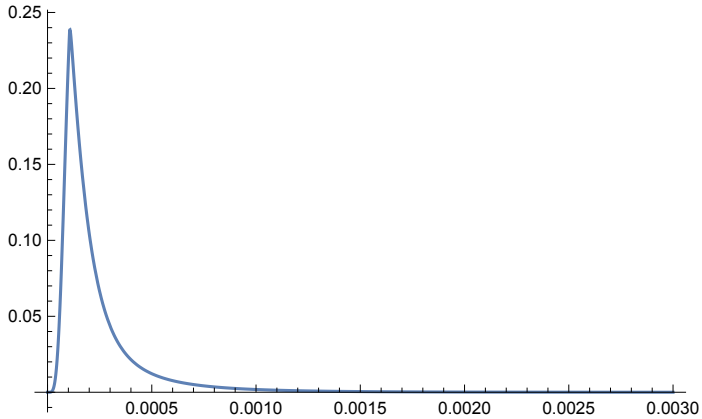
Out[634]=



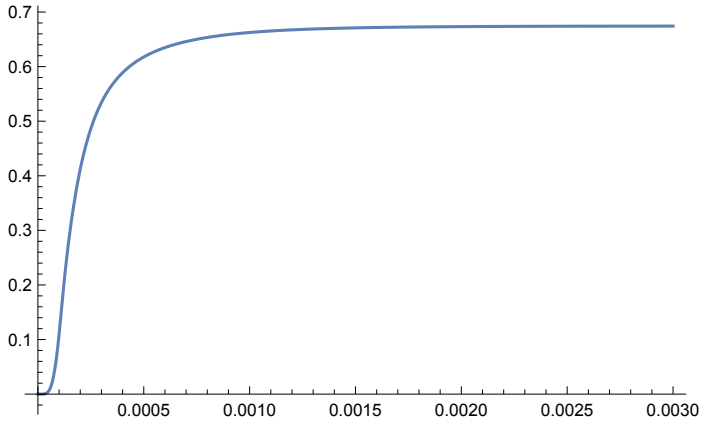
Out[635]=



Out[636]=



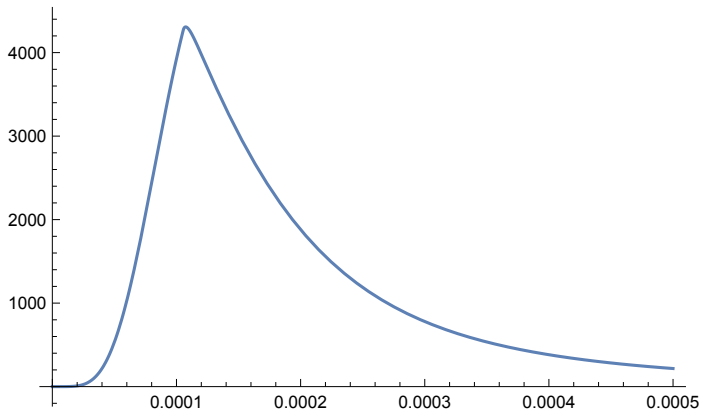
Out[637]=



Plot EPSC

In[638]:=
```
epscHighCa = D[((ss7A[t] + ss7B[t]) /. myNDSolveResults), t];
Plot[epscHighCa, {t, 0, 2*^-3}, PlotRange → All];
Plot[epscHighCa, {t, 0, 0.5*^-3}, PlotRange → All]
```

Out[640]=

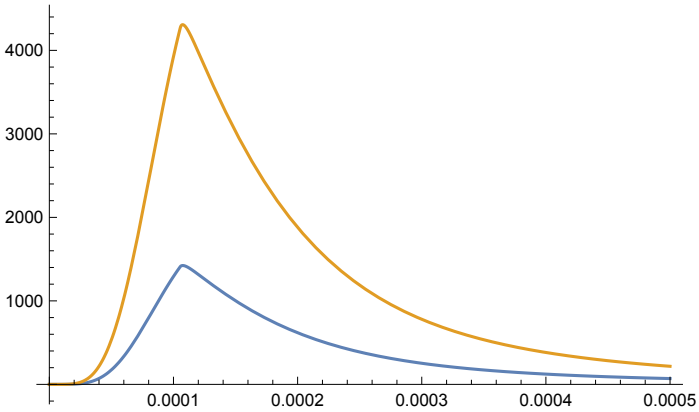


Compare

Plot both release rates

In[641]:=
```
Plot[{epscLowCa, epscHighCa}, {t, 0, 0.5*^-3}, PlotRange → All]
```

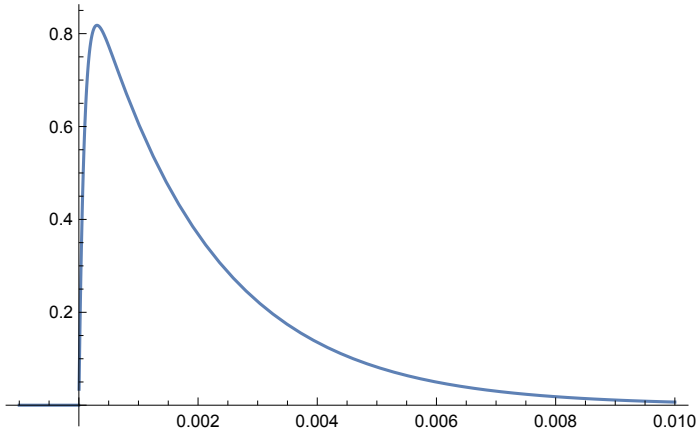
Out[641]=



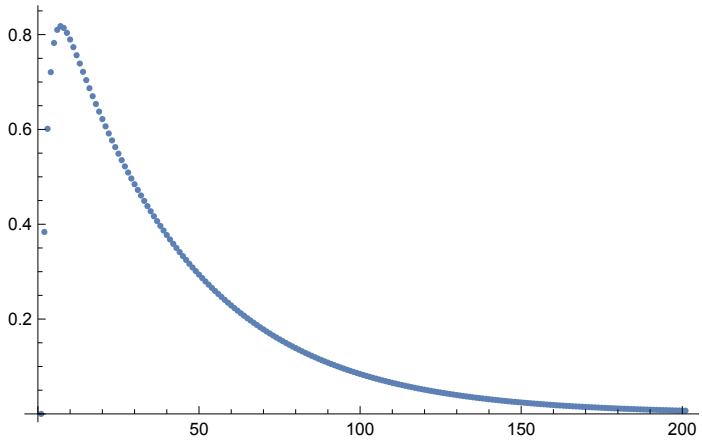
Convolution RelRate => EPSC

In[642]:=
```
miniKernel[t_] := If[t ≤ 0, 0, (1 - Exp[-t / 0.0001]) * Exp[-t / 0.002]];
Plot[miniKernel[t], {t, -.001, .01}]
dtForConvolve = 0.00005;
tEndConv = 0.01;
miniKernelList = Table[miniKernel[t], {t, 0.0, tEndConv, dtForConvolve}];
epscHighCaList = {Table[0, {t, 0, tEndConv, dtForConvolve}],
   Table[epscHighCa, {t, 0.0, 0.0025, dtForConvolve}],
   Table[0, {t, 0, tEndConv, dtForConvolve}]} // Flatten;
epscLowCaList = {Table[0, {t, 0, tEndConv, dtForConvolve}],
   Table[epscLowCa, {t, 0.0, 0.0025, dtForConvolve}],
   Table[0, {t, 0, tEndConv, dtForConvolve}]} // Flatten;
ListPlot[miniKernelList]
ListPlot[epscLowCaList, PlotRange → All]
```

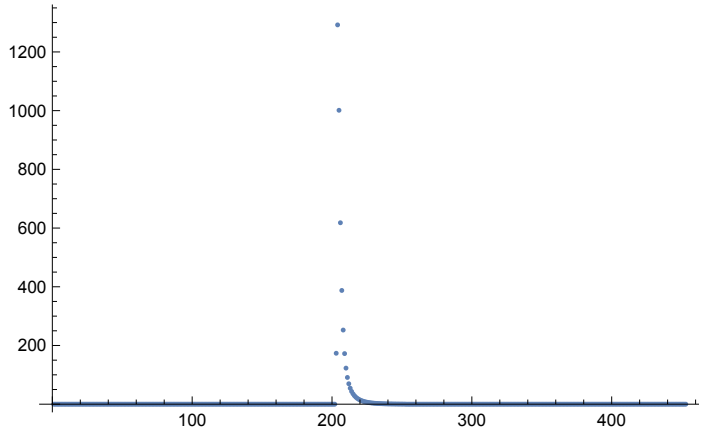
Out[643]=



Out[648]=

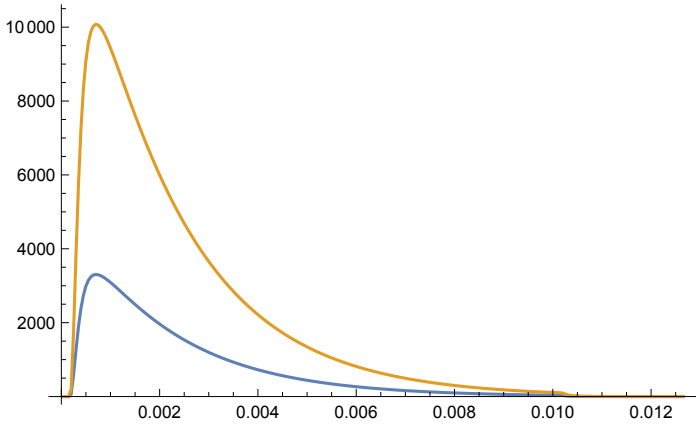


Out[649]=

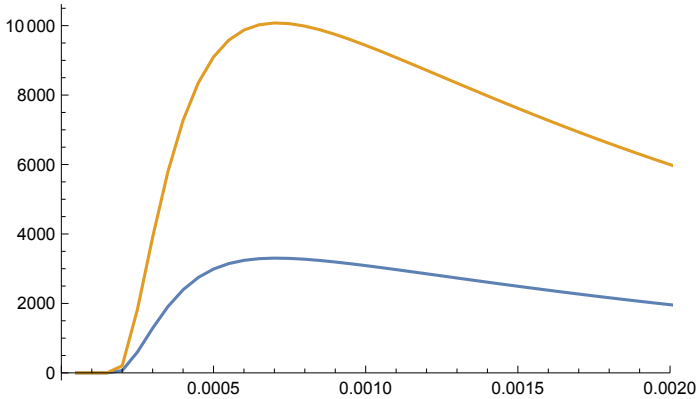


In[650]:=
```
epscLowCaCurrentList = ListConvolve[miniKernelList, epscLowCaList];
epscHighCaCurrentList = ListConvolve[miniKernelList, epscHighCaList];
timeConv = Table[t * dtForConvolve, {t, Length[epscLowCaCurrentList]}];
ListPlot[{Transpose[{timeConv, epscLowCaCurrentList}],
  Transpose[{timeConv, epscHighCaCurrentList}]}, Joined → True, PlotRange → All]
ListPlot[{Transpose[{timeConv, epscLowCaCurrentList}],
  Transpose[{timeConv, epscHighCaCurrentList}]},
 Joined → True, PlotRange → {{0, 0.002}, All}]
maxLow = Max[epscLowCaCurrentList]
maxHigh = Max[epscHighCaCurrentList]
Print["maxHigh/maxLow = ", maxHigh / maxLow];
ListPlot[{Transpose[{timeConv, (1 / maxLow) * epscLowCaCurrentList}],
  Transpose[{timeConv, (1 / maxHigh) * epscHighCaCurrentList}]},
 Joined → True, PlotRange → All]
ListPlot[{Transpose[{timeConv, (1 / maxLow) * epscLowCaCurrentList}],
  Transpose[{timeConv, (1 / maxHigh) * epscHighCaCurrentList}]},
 Joined → True, PlotRange → {{0, 0.002}, All}]
If[exportYes == 1,
  toExport = Transpose[{timeConv, epscLowCaCurrentList, epscHighCaCurrentList,
      (1 / maxLow) * epscLowCaCurrentList, (1 / maxHigh) * epscHighCaCurrentList}];
  Export["plot EPSC - low and high - abs and norm.txt", toExport, "Table"];
 ];
```

Out[653]=



Out[654]=

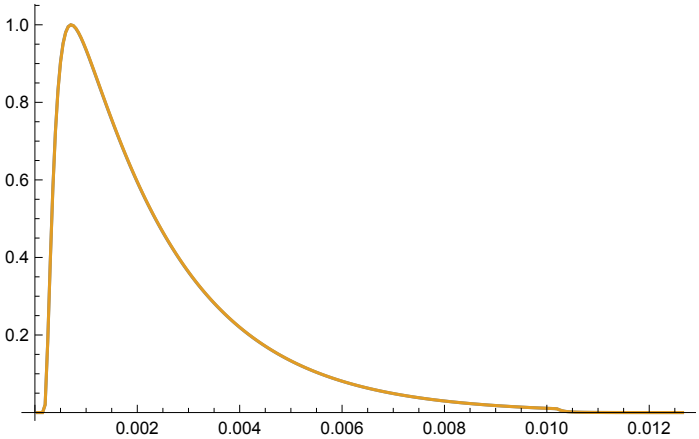


Out[655]= 3304.39

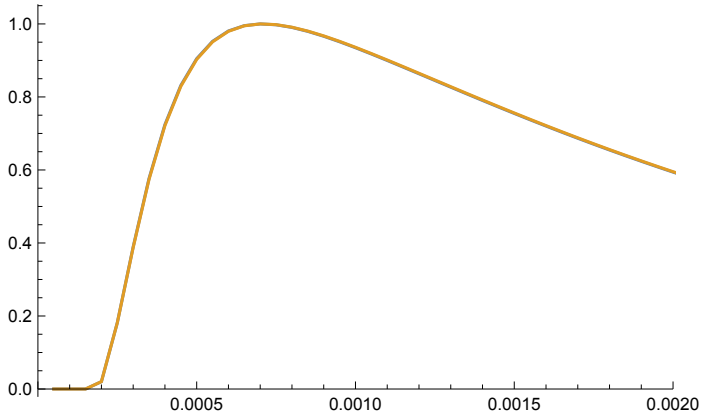
Out[656]= 10 076.8

```
maxHigh/maxLow = 3.0495
```

Out[658]=



Out[659]=



Timing

In[661]:=
```
timeEnd = AbsoluteTime[]
(timeEnd - timeStart) / 60.(*time of calculation in min*)
```

Out[661]= $3.839332646337322 \times 10^{9}$

Out[662]= 103.531