

Pcrit Run Evaluation

Kirt L Onthank

2022-07-27

```
library(OTools)
library(respirometry)
```

```
## Loading required package: PKNCA
```

```
library(knitr)
```

```
files=list.files(recursive=T)
resp.files=grep(".txt",files,value=T)
pcrit.files=grep("pcrit|pcrti",resp.files,value=T,ignore.case=T)
pcrit.files=pcrit.files[!duplicated(basename(pcrit.files))]

pcrit.files.read=pcrit.files[!grepl("ch2.txt|ch3.txt|ch4.txt|\\(1\\).txt",pcrit.files)]
write.csv(basename(pcrit.files.read),file = "pcrit_read_log.csv")
pcrit.files.read
```

```
## [1] "All Pcrits/Gr1 Muus 1000-2 pcrit 7-27-21 B.txt"
## [2] "All Pcrits/Gr1 Muus 1000-2 pcrit 7-27-21.txt"
## [3] "All Pcrits/Gr1 Muus 1800-2 pcrit 25 ml jar 7-29-21 ch2 blank.txt"
## [4] "All Pcrits/Gr1 Muus 1800-2 pcrit 7-28-21.txt"
## [5] "All Pcrits/GR1 Muus 1800-2 pcrit day7 8-3-21.txt"
## [6] "All Pcrits/GR1 Muus1000 7day-7-26-21.txt"
## [7] "All Pcrits/GR1 Muus1000 pcrit 7-21-21.txt"
## [8] "All Pcrits/GR1 Muus1800 7day-pcrit 7-20-21.txt"
## [9] "All Pcrits/GR1 Muus1800 pcrit 7-13-21.txt"
## [10] "All Pcrits/Gr2 Muus1000-2 pcrit 7-26-21.txt"
## [11] "All Pcrits/gr2muus 1000 pcrit 7-21-21.txt"
## [12] "All Pcrits/gr2muus1800 7day pcrit 7-20-21.txt"
## [13] "All Pcrits/gr2muus1800-2 pcrit 7-28-21.txt"
## [14] "All Pcrits/gr2muus1800-2 pcrit day7 8-3-21.txt"
## [15] "All Pcrits/gr2muus1800-2 pcrit in 25 ml jar 7-29-21 ch2 is blank.txt"
## [16] "All Pcrits/Gr3 Muus 1000 pcrit 7-21-21.txt"
## [17] "All Pcrits/gr3 muus 1800 7day Pcrit 7-20-21.txt"
## [18] "All Pcrits/gr3 muus 1800 pcrit 7-13-21.txt"
## [19] "All Pcrits/Gr3 Muus 1800-2 pcrit 07-28-21.txt"
## [20] "All Pcrits/Gr3 Muus 1800-2 pcrit 08-03-21.txt"
## [21] "All Pcrits/Gr3 Muus1000-2 7 day pcrit 7-27-21.txt"
## [22] "All Pcrits/GR4MUUS1000-2Pcrit-7-26-21-ch1.txt"
## [23] "All Pcrits/GR4MUUS1000Pcrit-7-21-21-ch1.txt"
## [24] "All Pcrits/GR4MUUS1800-2-7dayPcrit-8-3-21-ch1.txt"
```

```
## [25] "All Pcrits/GR4MUUS1800-2Pcrit-7-28-21-ch1.txt"
## [26] "All Pcrits/GR4MUUS1800-7dayPcrit-7-20-21-ch1.txt"
## [27] "All Pcrits/GR4MUUS1800Pcrit-7-13-21-ch1.txt"
## [28] "All Pcrits/tbocto 1000 pcrit tank 1 and 2 day 7 8-19-21.txt"
## [29] "All Pcrits/tbocto 1000 pcrit tank 3 and 4 8-11-21-ch1.txt"
## [30] "All Pcrits/tbocto 1000 pcrit tank 3 and 4 day 7 8-19-21-ch1.txt"
## [31] "All Pcrits/Tbocto 1000 pcrti tank 1 and 2 8-11-21.txt"
## [32] "Group 2/Pcrit/gr2muus1000 pcrit 7-21-21.txt"
## [33] "Group 2/Pcrit/gr2muus1000-2 pcrit 7-26-21.txt"
## [34] "Group 2/Pcrit/GR2MUUS18007dayPcrit-7-20-21.txt"
## [35] "Trueblood after session/gr2MUUS1800-2pcritday7.8-3-21.txt"
## [36] "Trueblood after session/Muus TB collected data/desktop from presense onthank/tbocto 1800 pcrit
```

```
pcrit.log=read.csv("pcrit_log.csv")
routine=read.csv("RMR_Results.csv")
```

```
pcrits=data.frame(filename=as.character(),spreadsheet_guess=as.character(),octo=as.character(),mass=as.
```

```
co=1

for (i in 1:length(pcrit.files.read)){
  filename=pcrit.files.read[i]

  if(length(grep("Group 4|presens|ch\\d\\.txt",basename(filename))))>0){
    pcrit.raw=read.presens(filename)
  }else{
    pcrit.raw=read.pyro(filename)
  }

  guess=which.min(adist(basename(filename),pcrit.log$filename))
  ch=pcrit.log$ch1[guess]
  octo=pcrit.log$octo1[guess]
  start=pcrit.log[guess,6+ch]
  stop=max(pcrit.raw$times)-pcrit.log[guess,10+ch]
  mass=mean(routine$mass[routine$octo==octo])
  rmr=mean(routine$rmr[routine$octo==octo])

  pcrit.working=
    pcrit.raw[
      pcrit.raw$times>start&
      pcrit.raw$times<stop,
    ]

  plot(pcrit.raw[,3+ch]~pcrit.raw$times,type="l",main=basename(filename))
  points(pcrit.working[,3+ch]~pcrit.working$times,type="l",col="red")

  pcrit.resp=resp.closed(pcrit.working,volume=pcrit.log$vol[guess],
    weight=mass,smooth="loess",channel=ch,smooth.span = 0.2)

  pcrit.bin=aggregate(pcrit.resp$resp~round(pcrit.resp$po2,1),FUN="mean")
  colnames(pcrit.bin)=c("po2", "resp")

  if(max(pcrit.bin$resp)>rmr){
```

```

    plot_pcrit(pcrit.bin$po2,pcrit.bin$resp,
               avg_top_n = 3,MR=rmr)
}else{
    plot_pcrit(pcrit.bin$po2,pcrit.bin$resp,
               avg_top_n = 3)
}

pcrits[co,1]=basename(filename)
pcrits[co,2]=pcrit.log$filename[guess]
pcrits[co,3]=octo
pcrits[co,4]=mass
pcrits[co,5]=pcrit.log$po2[guess]
pcrits[co,6]=pcrit.log$day[guess]
pcrits[co,7]=rmr
if (min(pcrit.working[,3+ch])<50){
    if(max(pcrit.bin$resp)>rmr){
        pcrits[co,8]=as.numeric(calc_pcrit(pcrit.bin$po2,pcrit.bin$resp,
                                           avg_top_n = 3,MR=rmr)[1])
    }else{
        pcrits[co,8]=as.numeric(calc_pcrit(pcrit.bin$po2,pcrit.bin$resp,
                                           avg_top_n = 3)[1])
    }
}else{
    pcrits[co,8]=NA
}
co=co+1

if(!is.na(pcrit.log$ch2[guess])){
    ch=pcrit.log$ch2[guess]
    octo=pcrit.log$octo2[guess]
    start=pcrit.log[guess,6+ch]
    stop=max(pcrit.raw$times)-pcrit.log[guess,10+ch]
    mass=mean(routine$mass[routine$octo==octo])
    rmr=mean(routine$rmr[routine$octo==octo])

    pcrit.working=
        pcrit.raw[
            pcrit.raw$times>start&
            pcrit.raw$times<stop,
        ]

    plot(pcrit.raw[,3+ch]~pcrit.raw$times,type="l",main=basename(filename))
    points(pcrit.working[,3+ch]~pcrit.working$times,type="l",col="red")

    pcrit.resp=resp.closed(pcrit.working,volume=pcrit.log$vol[guess],
                           weight=mass,smooth="loess",channel=ch,smooth.span = 0.2)
    pcrit.bin=aggregate(pcrit.resp$resp~round(pcrit.resp$po2,1),FUN="mean")
    colnames(pcrit.bin)=c("po2","resp")

    plot_pcrit(pcrit.bin$po2,pcrit.bin$resp,
               avg_top_n = 3,MR=rmr)

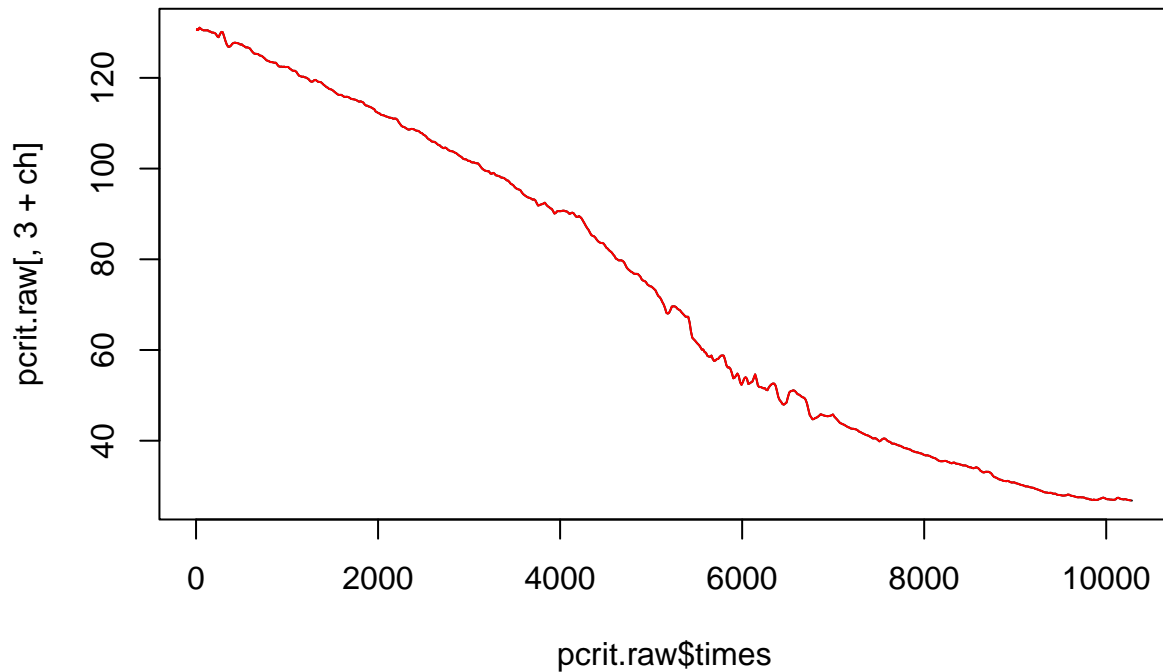
```

```

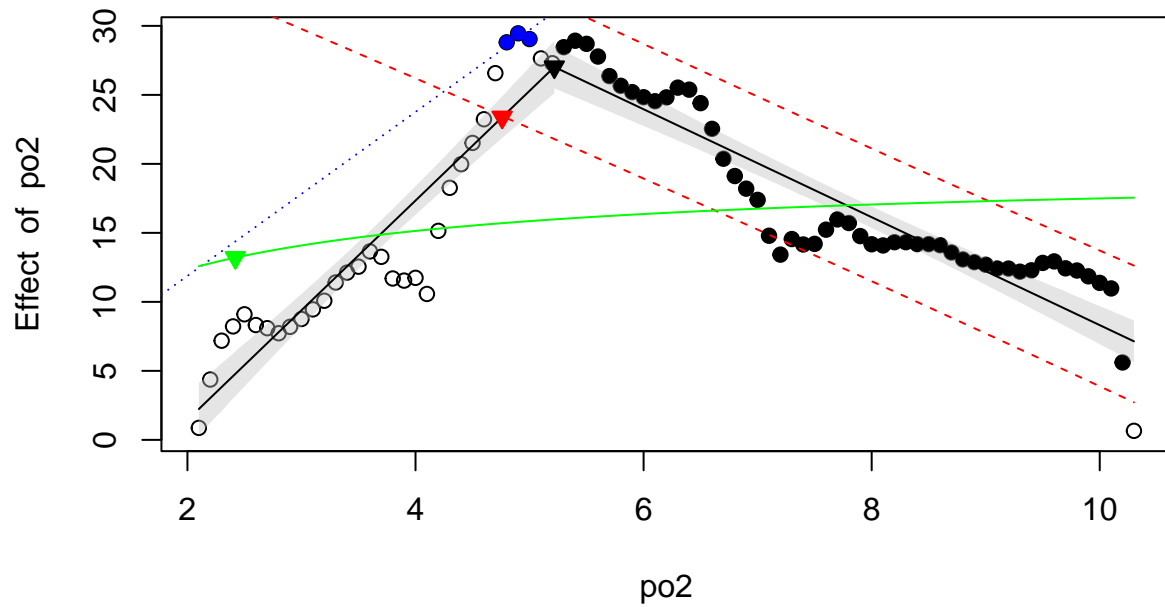
pcrits[co,1]=filename
pcrits[co,2]=pcrit.log$filename[guess]
pcrits[co,3]=octo
pcrits[co,4]=mass
pcrits[co,5]=pcrits$pc2[guess]
pcrits[co,6]=pcrits$day[guess]
pcrits[co,7]=rmr
if (min(pcrit.working[,3+ch])<50){
  if(max(pcrit.bin$resp)>rmr){
    pcrits[co,8]=as.numeric(calc_pcrit(pcrit.bin$po2,pcrit.bin$resp,
      avg_top_n = 3,MR=rmr)[1])
  }else{
    pcrits[co,8]=as.numeric(calc_pcrit(pcrit.bin$po2,pcrit.bin$resp,
      avg_top_n = 3)[1])
  }
}else{
  pcrits[co,8]=NA
}
co=co+1
}
}

```

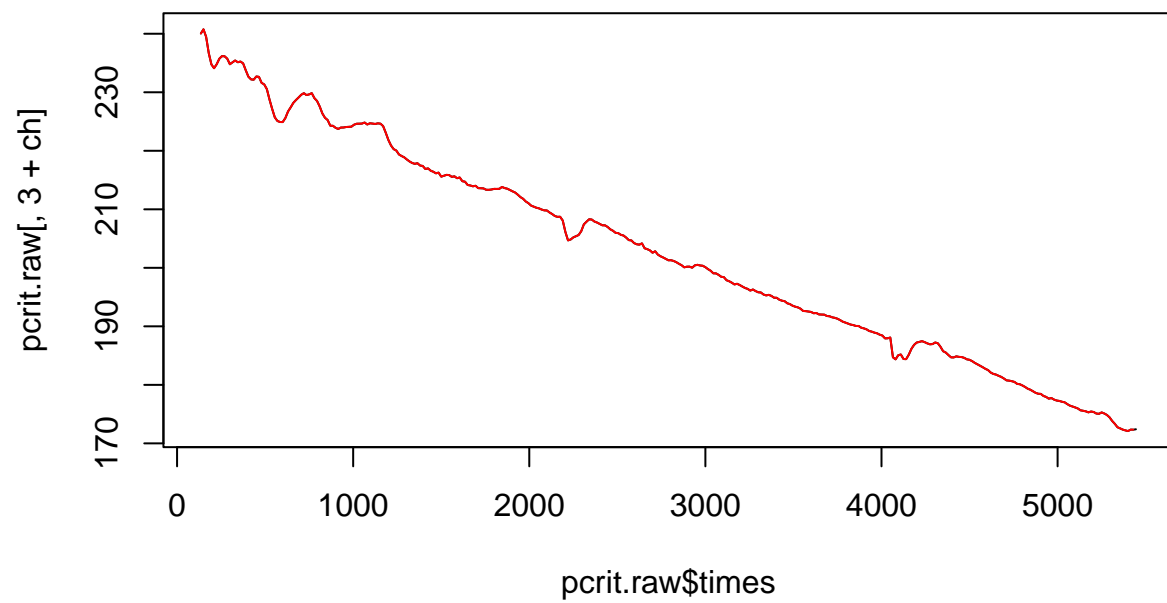
Gr1 Muus 1000-2 pcrit 7-27-21 B.txt



Alpha @ MR of 2.22 = 0.373
 Breakpoint = 5.217
 LLO @ MR of 2.22 = NA
 NLR (Michaelis-Menten) = 2.42
 Sub-PI = 4.76



Gr1 Muus 1000-2 pcrit 7-27-21.txt



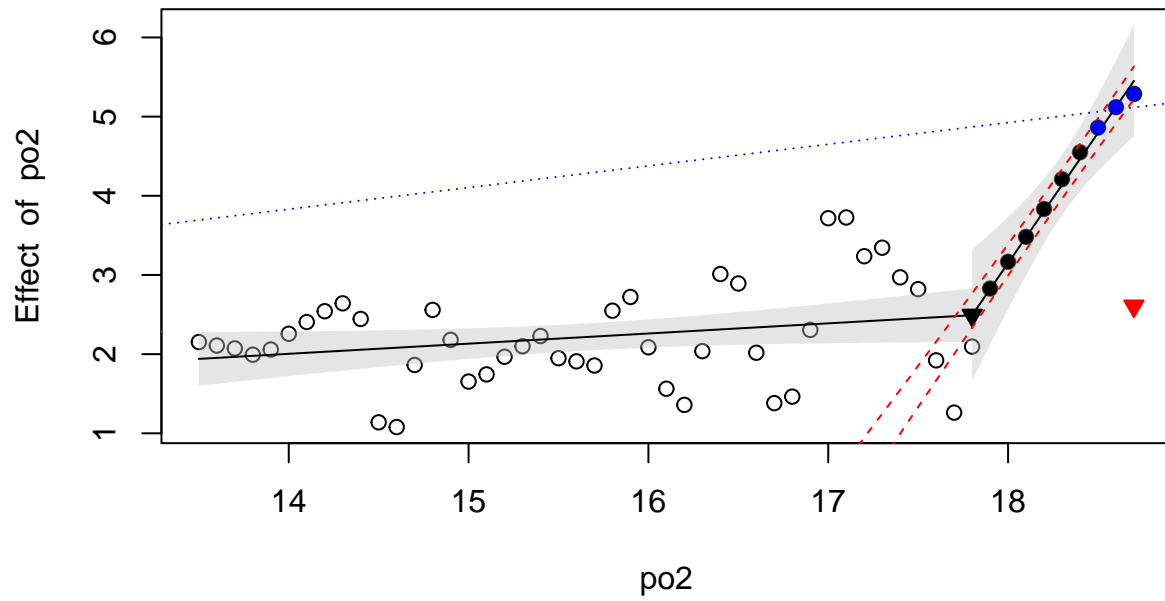
Alpha @ MR of 2.22 = 8.109

Breakpoint = 17.8

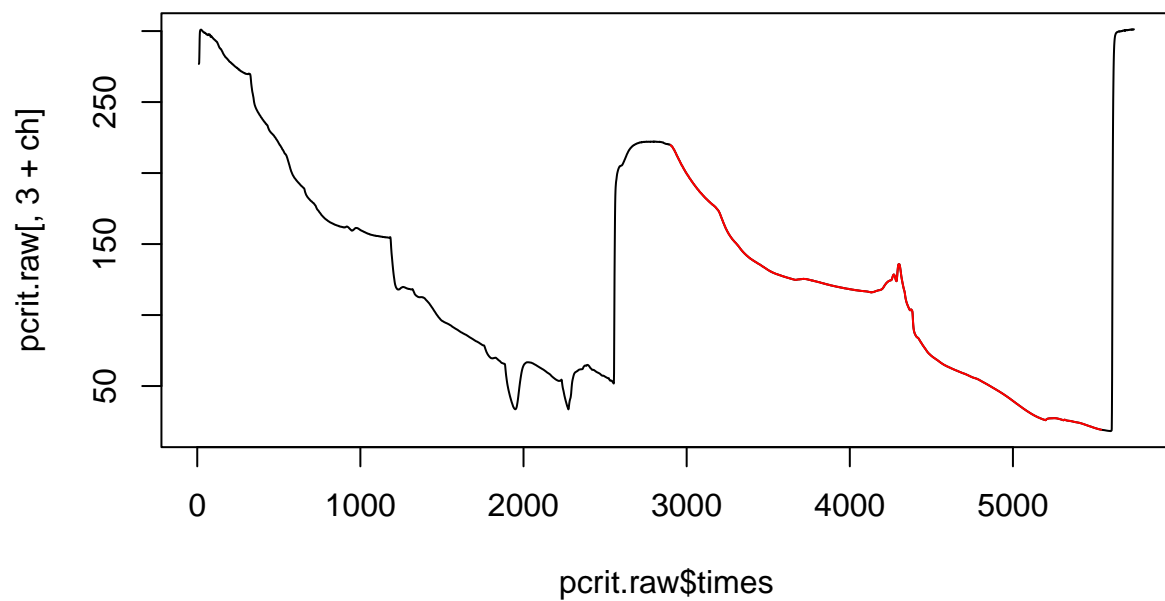
LLO @ MR of 2.22 = 13.235

NLR () = NA

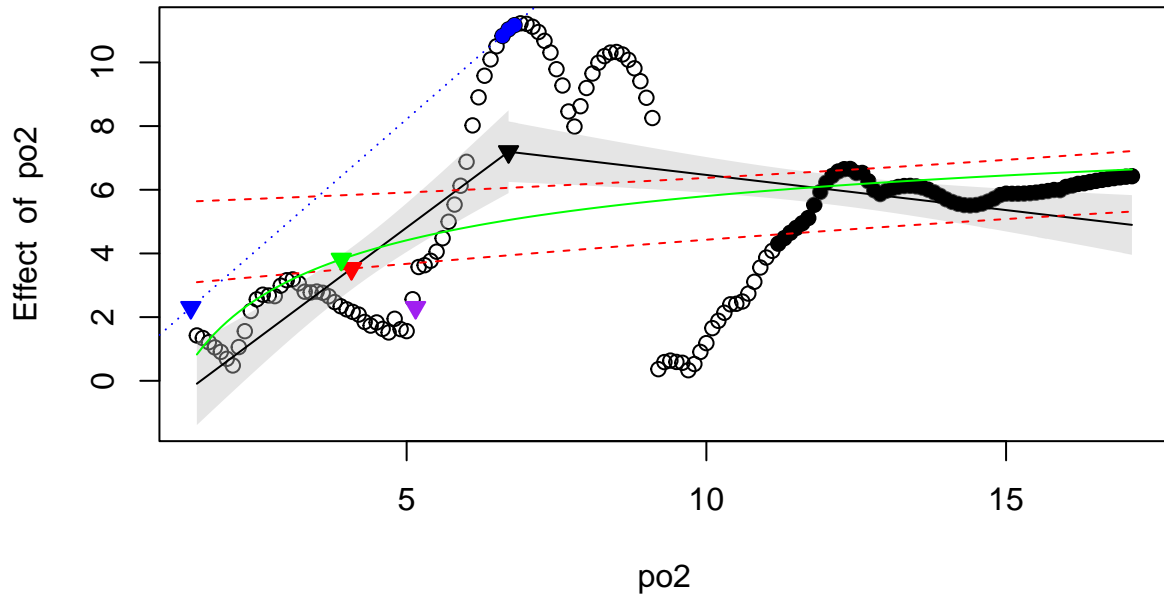
Sub-PI = 18.7



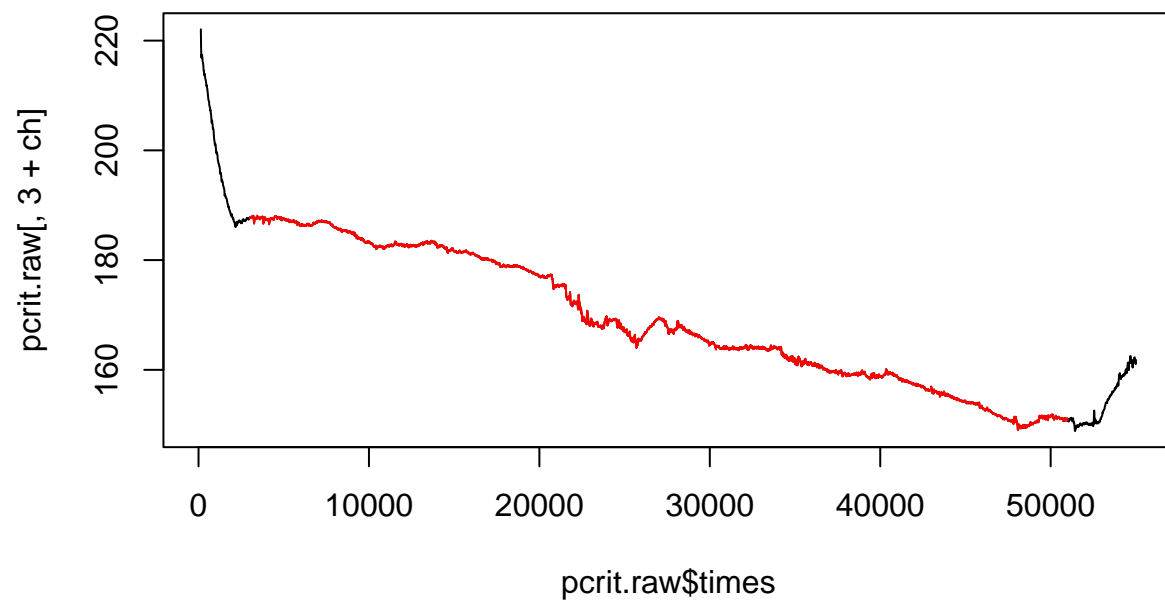
Gr1 Muus 1800-2 pcrit 25 ml jar 7-29-21 ch2 blank.txt



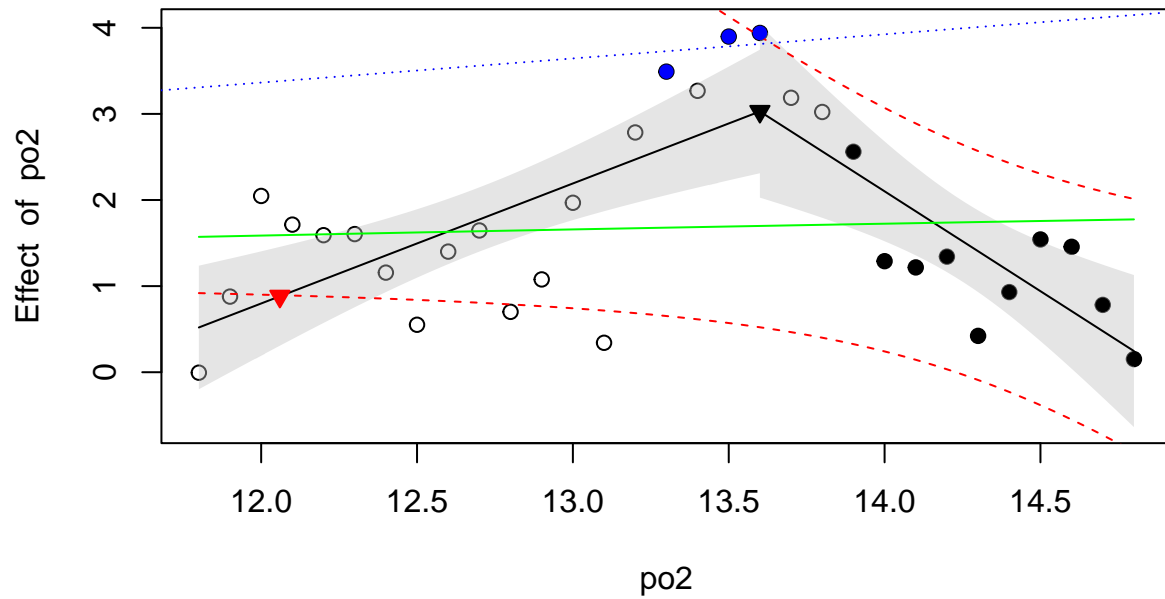
Alpha @ MR of 2.3 = 1.4
Breakpoint = 6.7
LLO @ MR of 2.3 = 5.149
NLR (Pareto) = 3.91
Sub-PI = 4.08



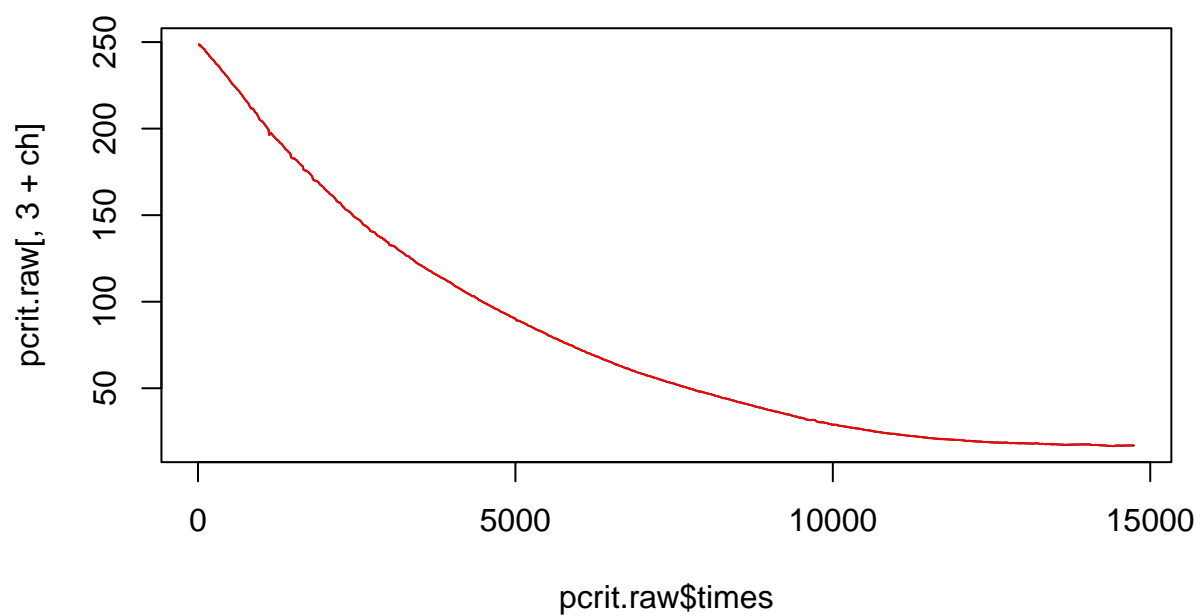
Gr1 Muus 1800-2 pcrit 7-28-21.txt



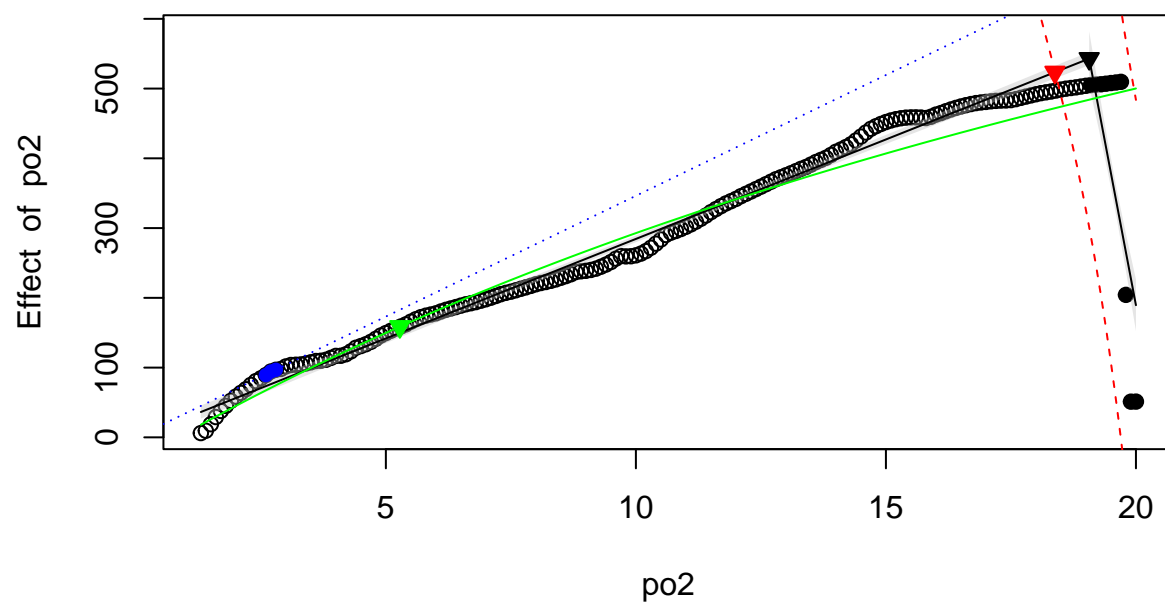
Alpha @ MR of 2.3 = 8.208
Breakpoint = 13.6
LLO @ MR of 2.3 = -181.516
NLR (Michaelis-Menten) = 0.829
Sub-PI = 12.06



GR1 Muus 1800-2 pcrit day7 8-3-21.txt

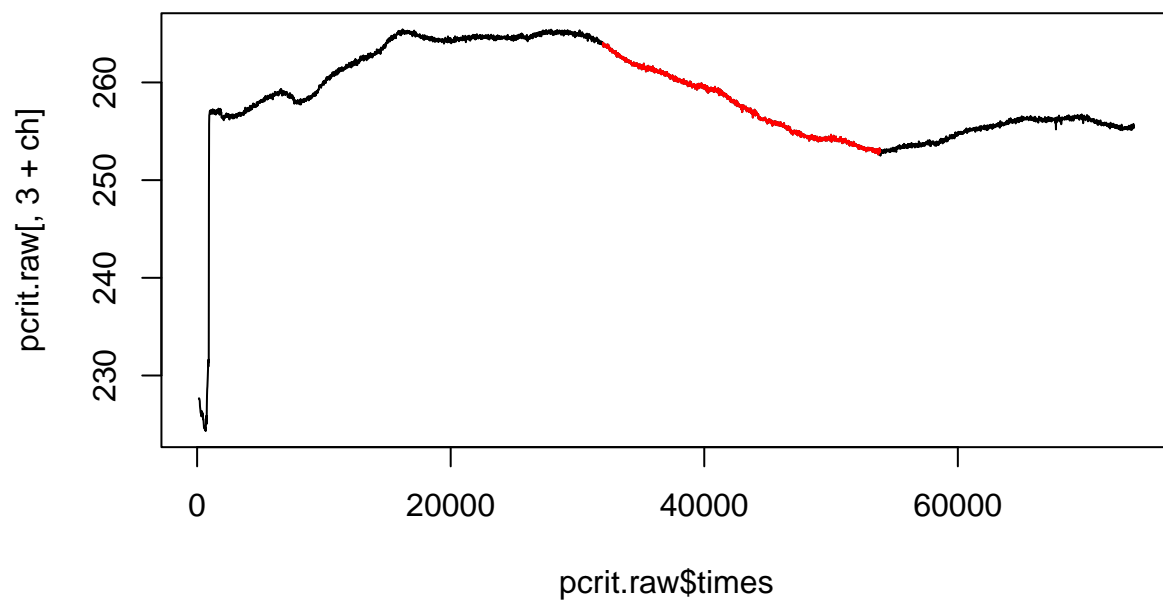


Alpha @ MR of 2.3 = 0.066
 Breakpoint = 19.065
 LLO @ MR of 2.3 = NA
 NLR (Hyperbola) = 5.28
 Sub-PI = 18.38



"MR" must be defined for LLO calculation.

GR1 Muus1000 7day-7-26-21.txt



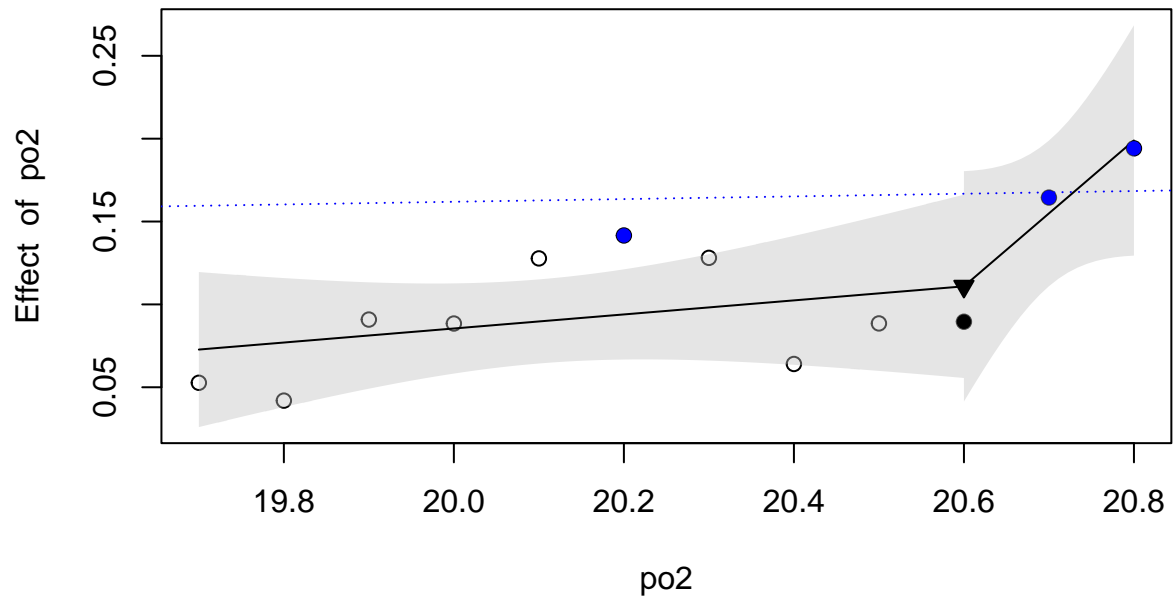
Alpha @ MR of 0.15 = 18.451

Breakpoint = 20.6

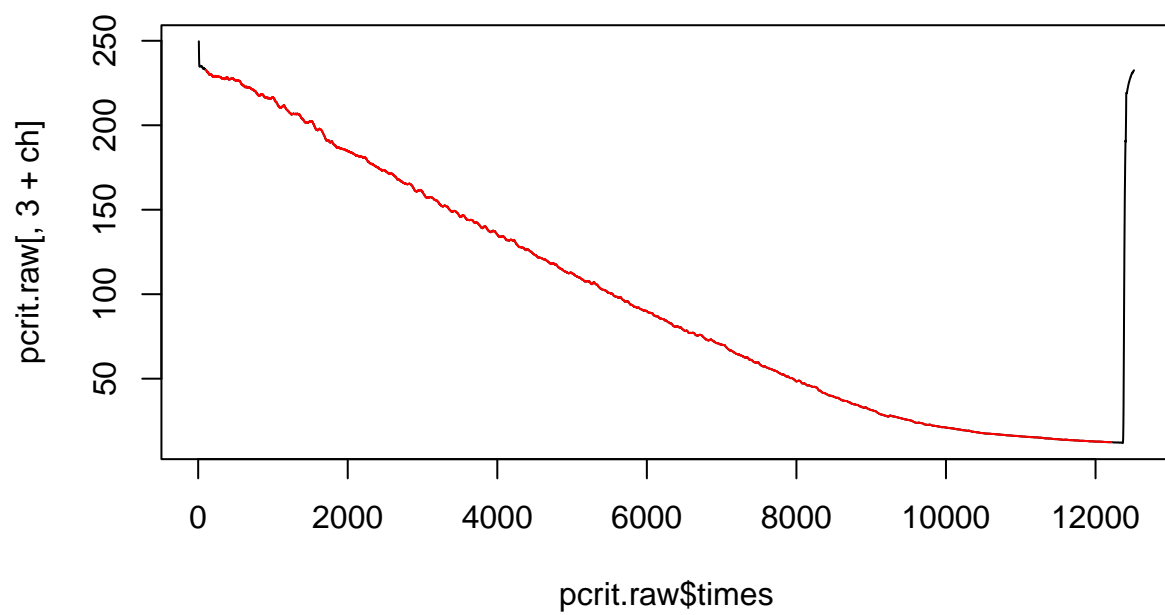
LLO @ MR of NA = NA

NLR () = NA

Sub-PI =



GR1 Muus1000 pcrit 7-21-21.txt



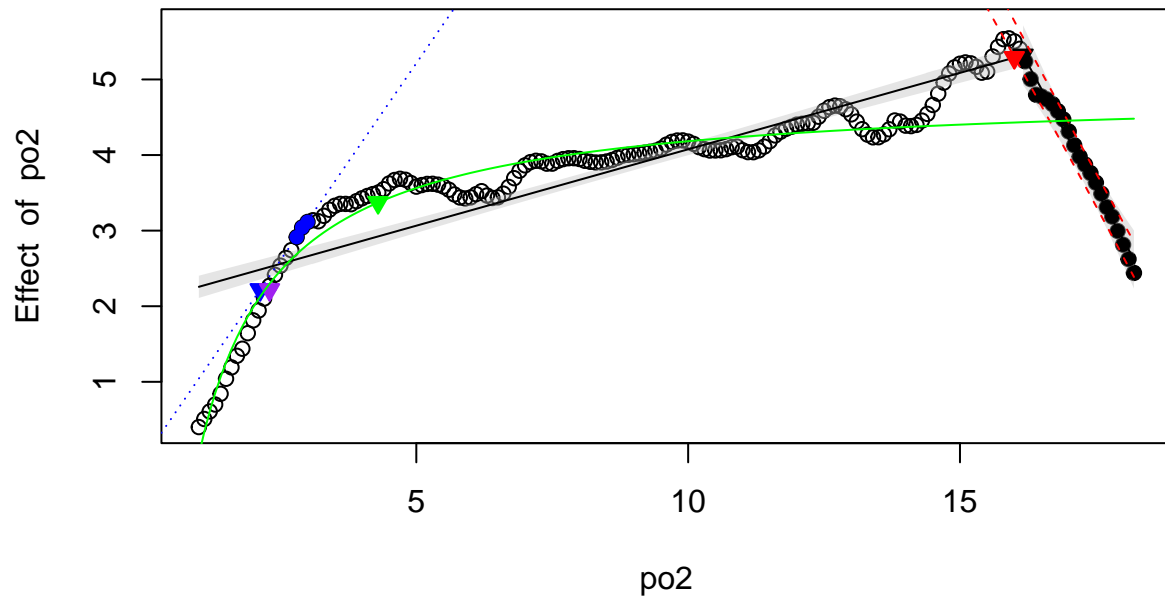
Alpha @ MR of 2.22 = 2.128

Breakpoint = 16.161

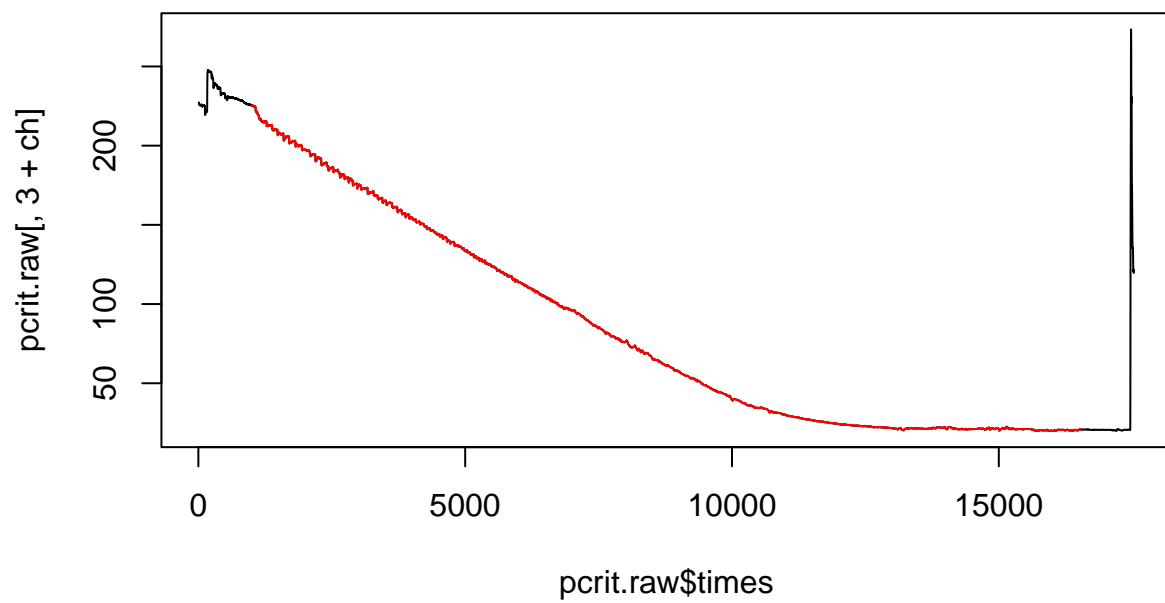
LLO @ MR of 2.22 = 2.3

NLR (Hyperbola) = 4.297

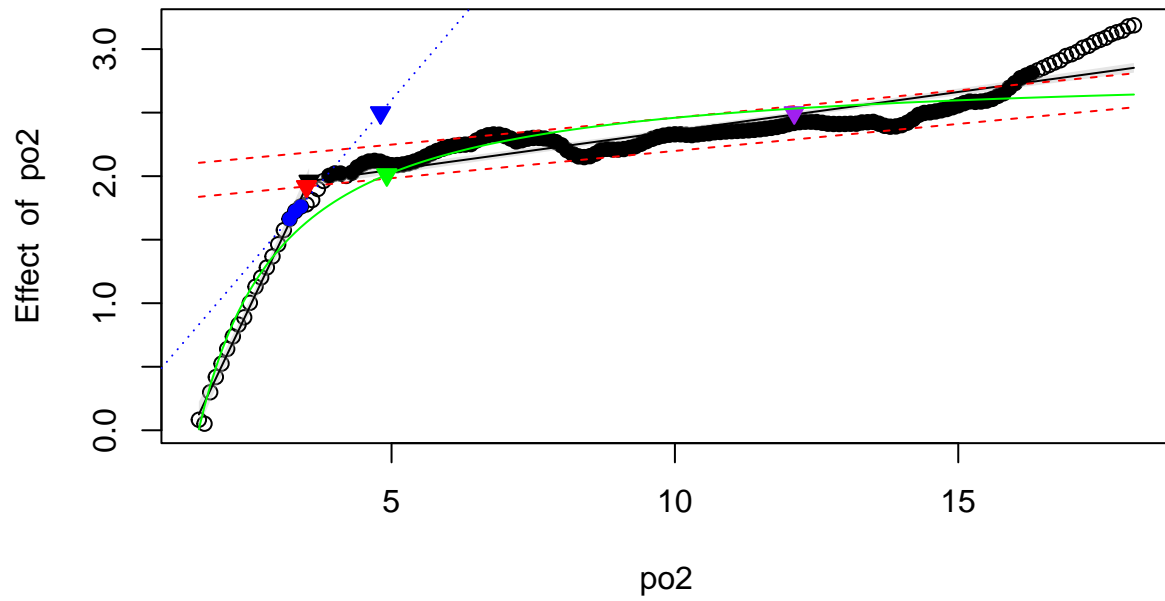
Sub-PI = 16



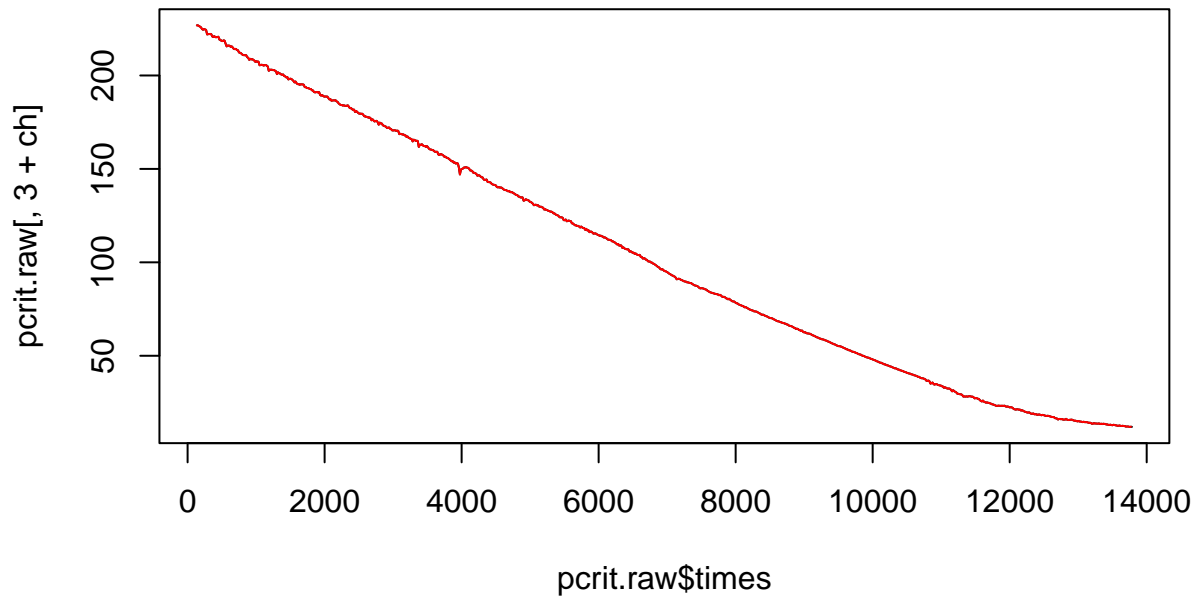
GR1 Muus1800 7day-pcrit 7-20-21.txt



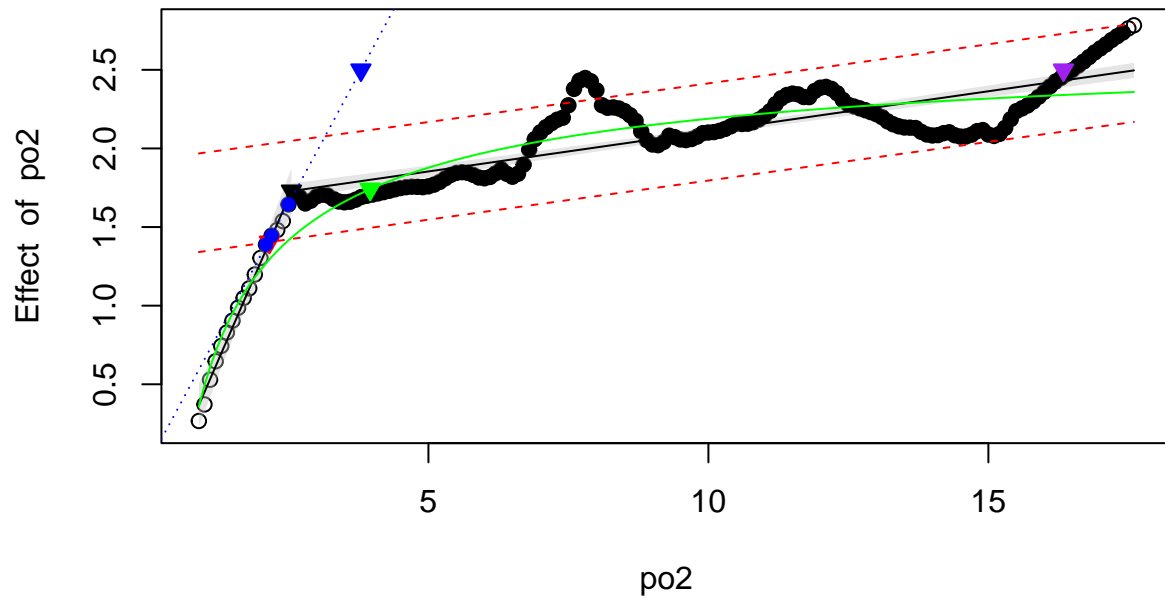
Alpha @ MR of 2.5 = 4.806
Breakpoint = 3.545
LLO @ MR of 2.5 = 12.106
NLR (Pareto) = 4.917
Sub-PI = 3.5



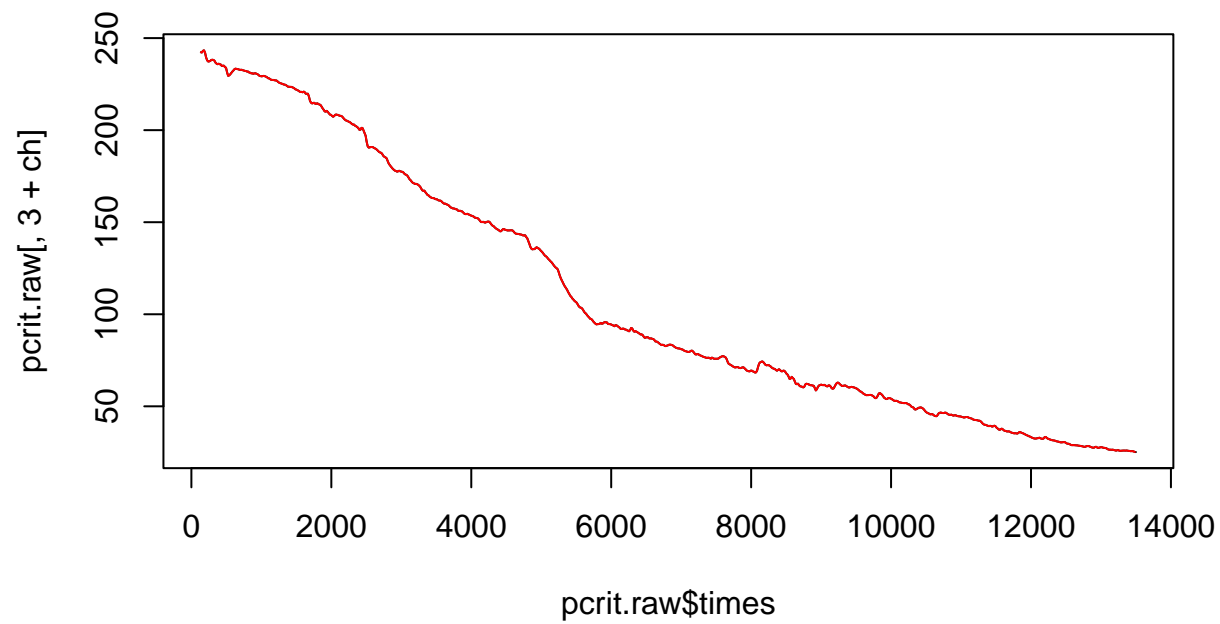
GR1 Muus1800 pcrit 7-13-21.txt



Alpha @ MR of 2.5 = 3.795
Breakpoint = 2.554
LLO @ MR of 2.5 = 16.341
NLR (Weibull with intercept) = 3.96
Sub-PI = 2.16



Gr2 Muus1000-2 pcrit 7-26-21.txt



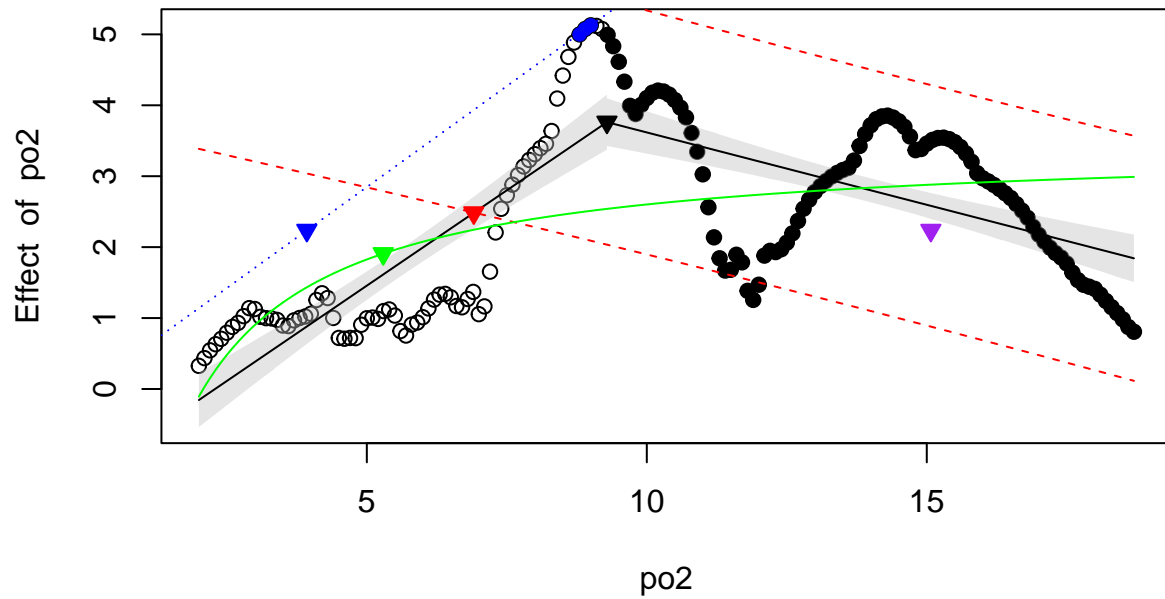
Alpha @ MR of 2.24 = 3.929

Breakpoint = 9.288

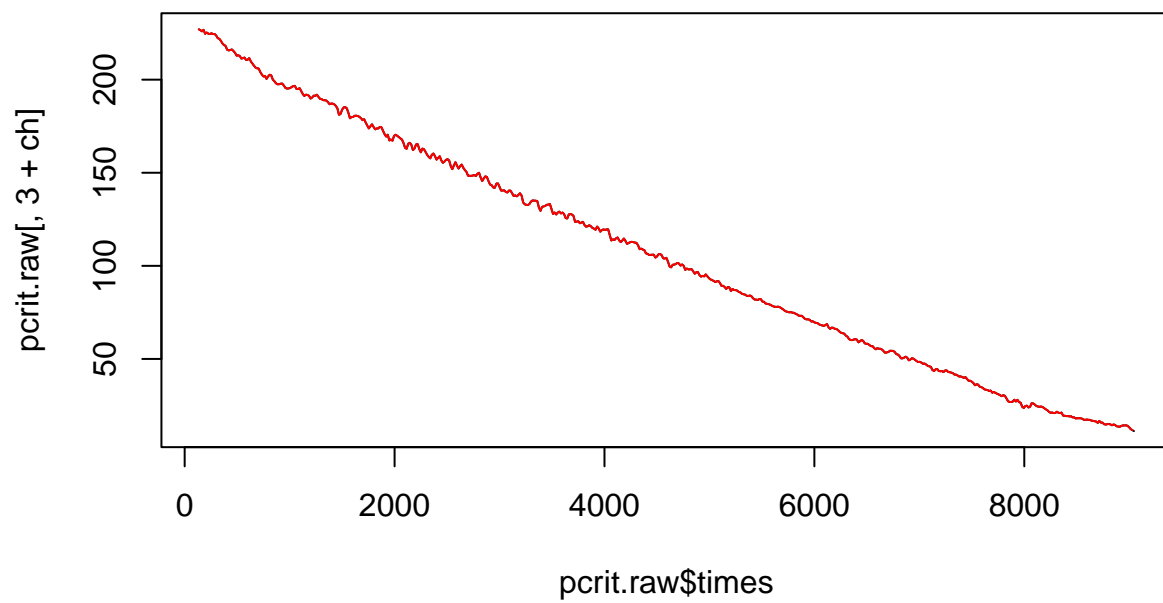
LLO @ MR of 2.24 = 15.073

NLR (Hyperbola) = 5.293

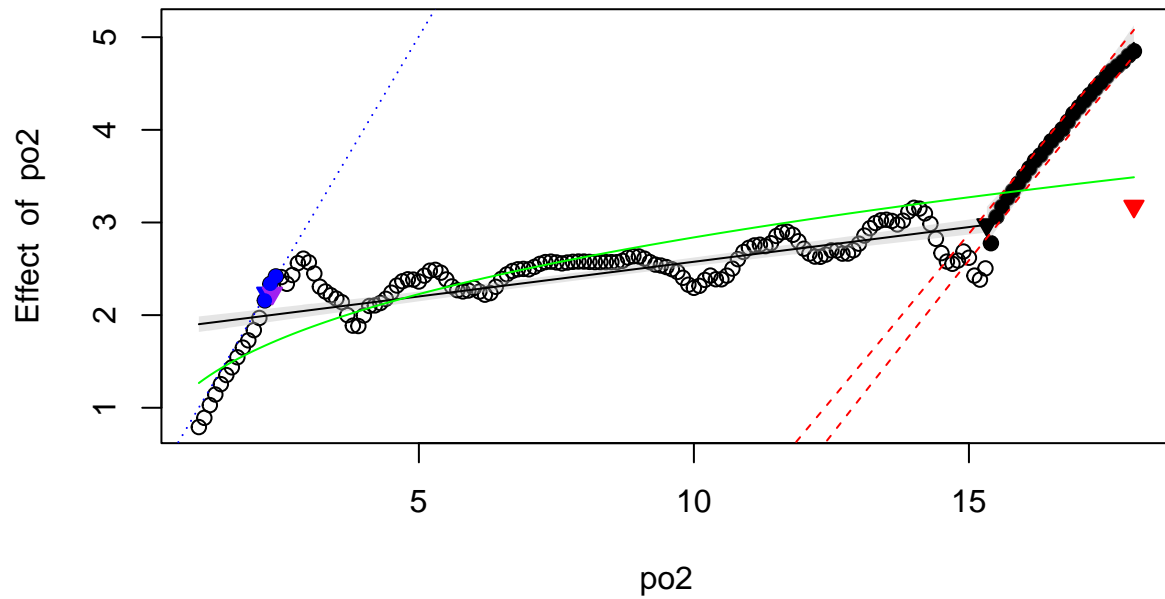
Sub-PI = 6.91



gr2muus 1000 pcrit 7-21-21.txt

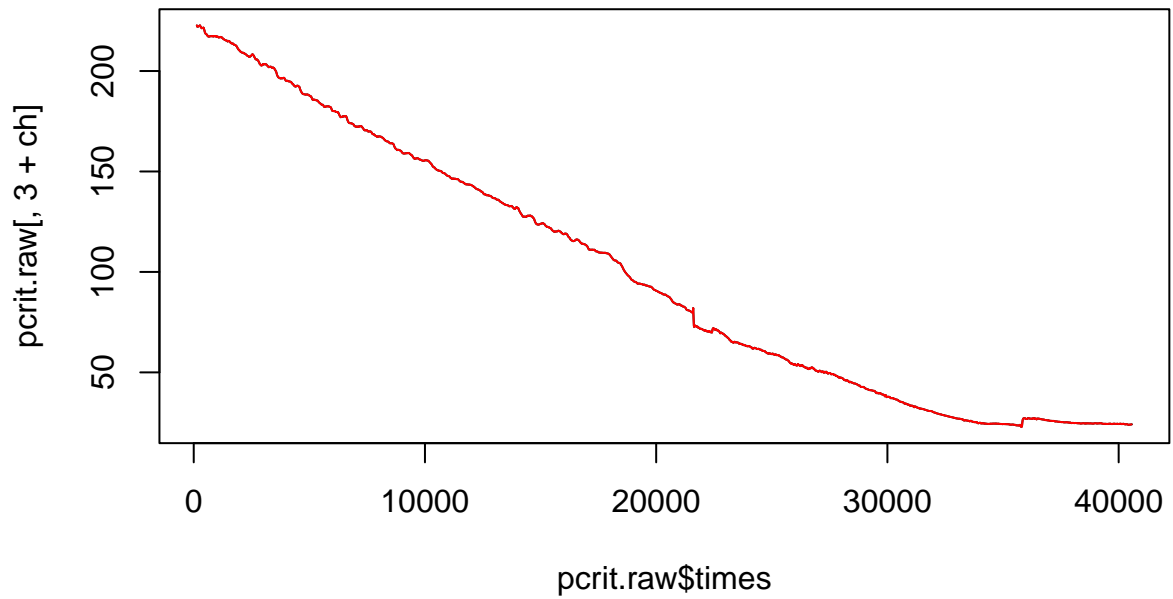


Alpha @ MR of 2.24 = 2.233
 Breakpoint = 15.327
 LLO @ MR of 2.24 = 2.337
 NLR (Power) = 64.181
 Sub-PI = 18



"MR" must be defined for LLO calculation.

gr2muus1800 7day pcrit 7-20-21.txt



"MR" must be defined for LLO calculation.

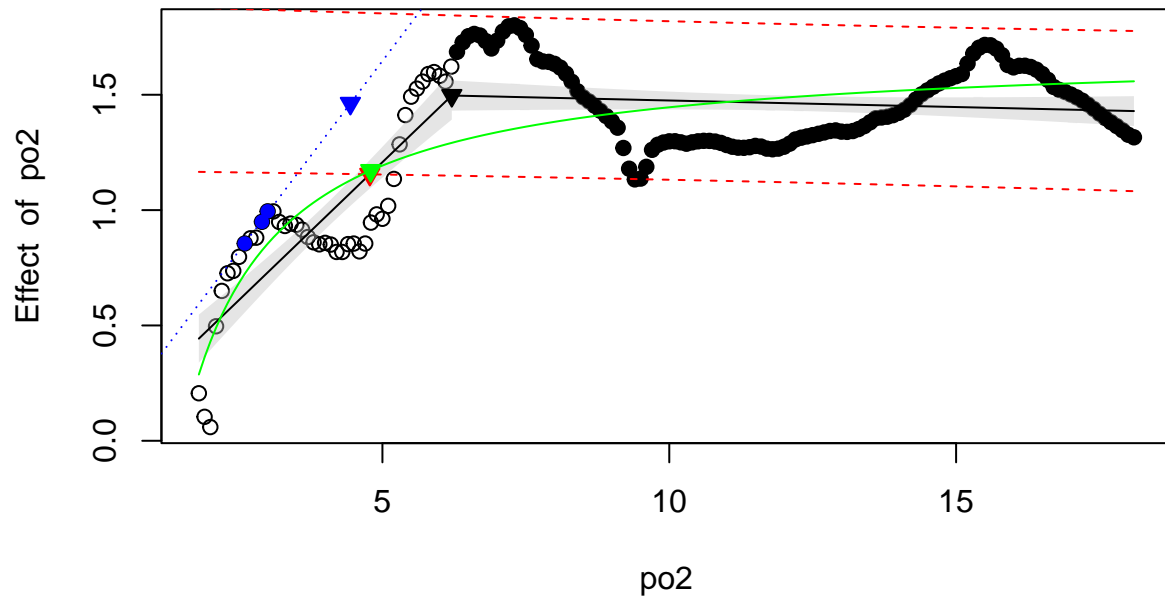
Alpha @ MR of 1.46 = 4.442

Breakpoint = 6.209

LLO @ MR of NA = NA

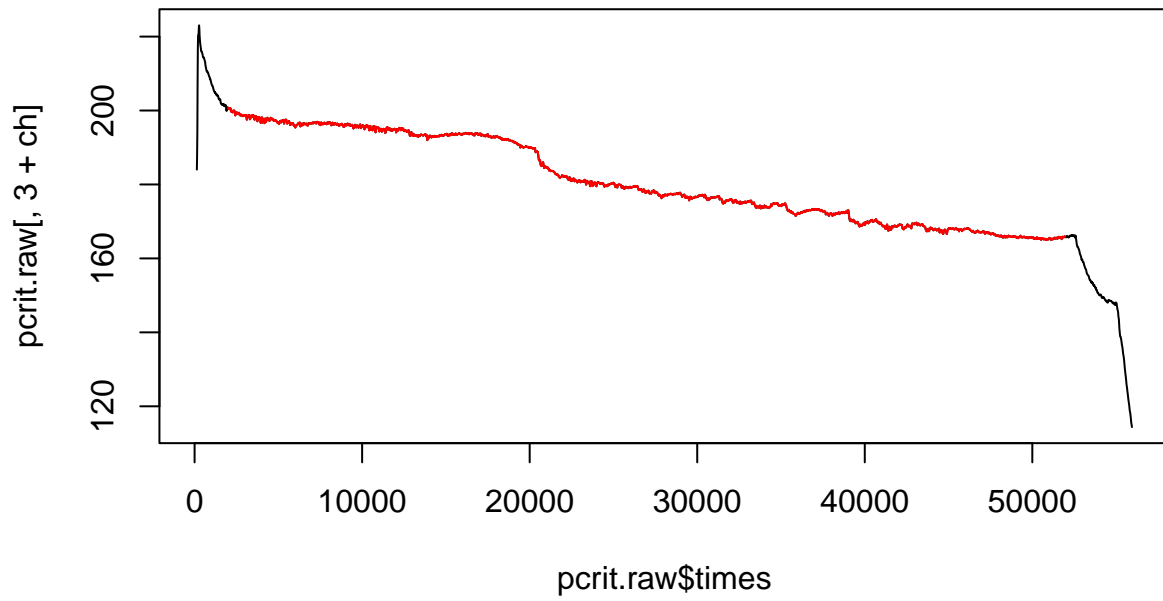
NLR (Pareto) = 4.796

Sub-PI = 4.78

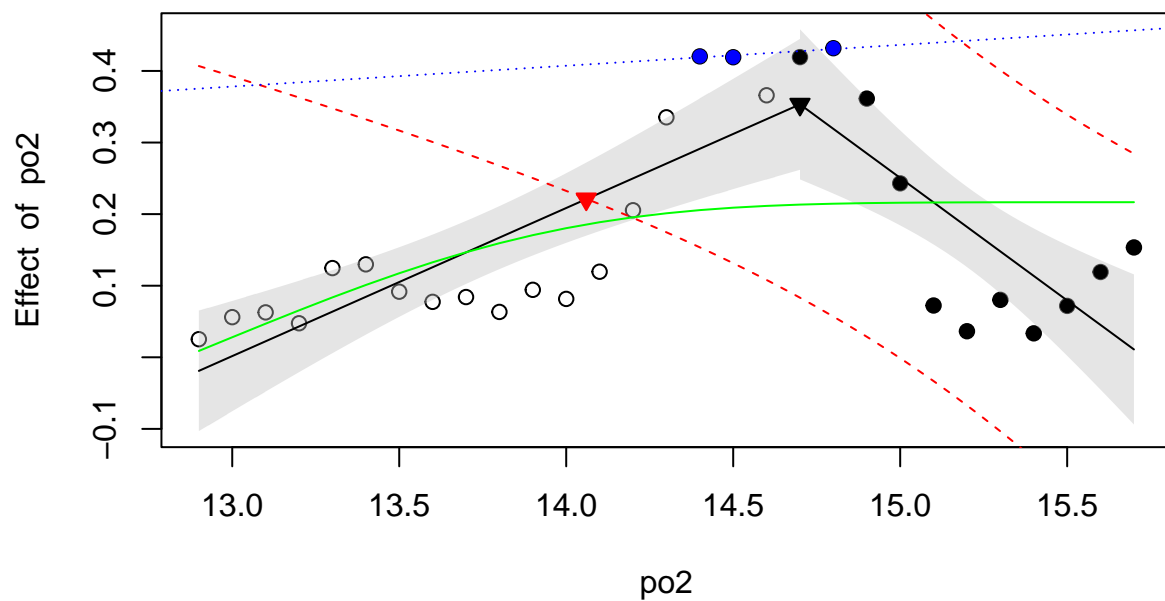


"MR" must be defined for LLO calculation.

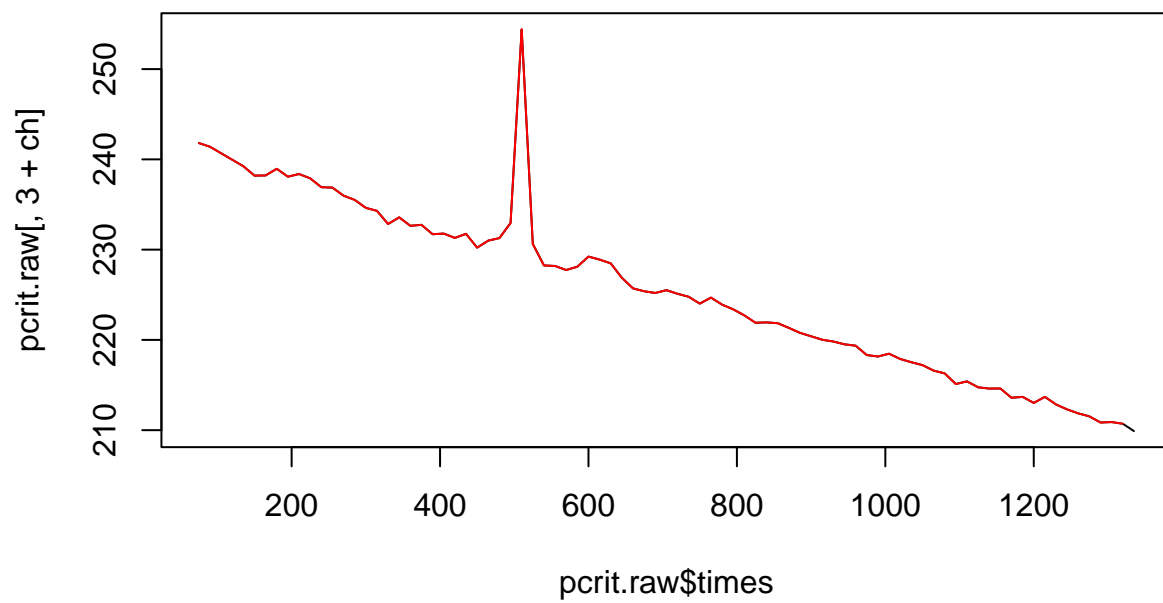
gr2muus1800-2 pcrit 7-28-21.txt



Alpha @ MR of 0.18 = 6.319
 Breakpoint = 14.7
 LLO @ MR of NA = NA
 NLR (Weibull with intercept) = 10.239
 Sub-PI = 14.06



gr2muus1800-2 pcrit day7 8-3-21.txt



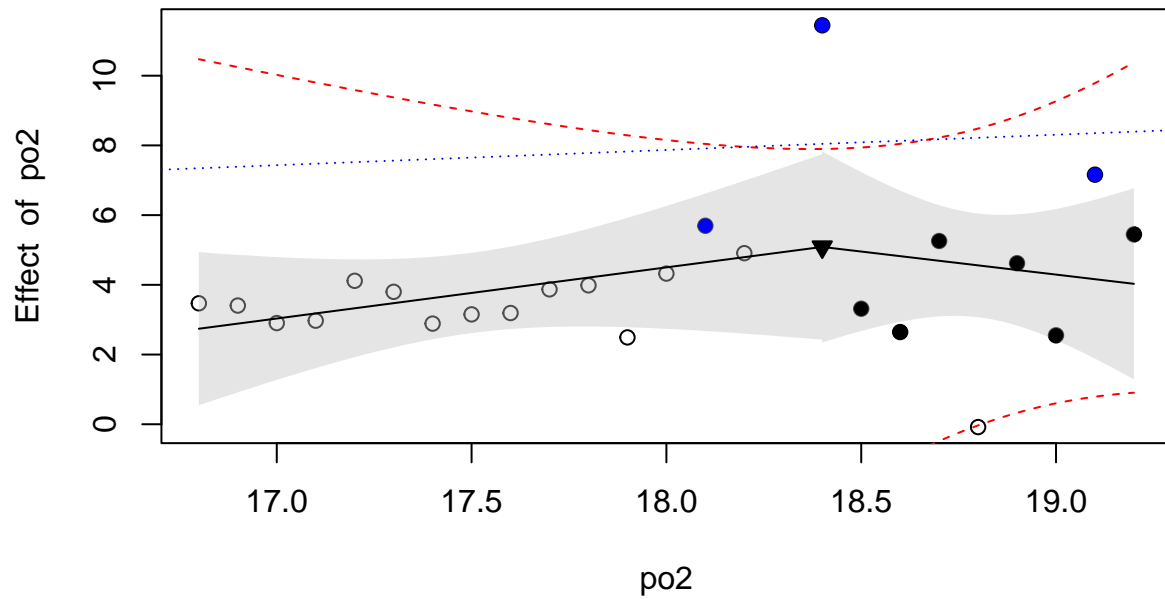
Alpha @ MR of 2.21 = 5.052

Breakpoint = 18.4

LLO @ MR of 2.21 = NA

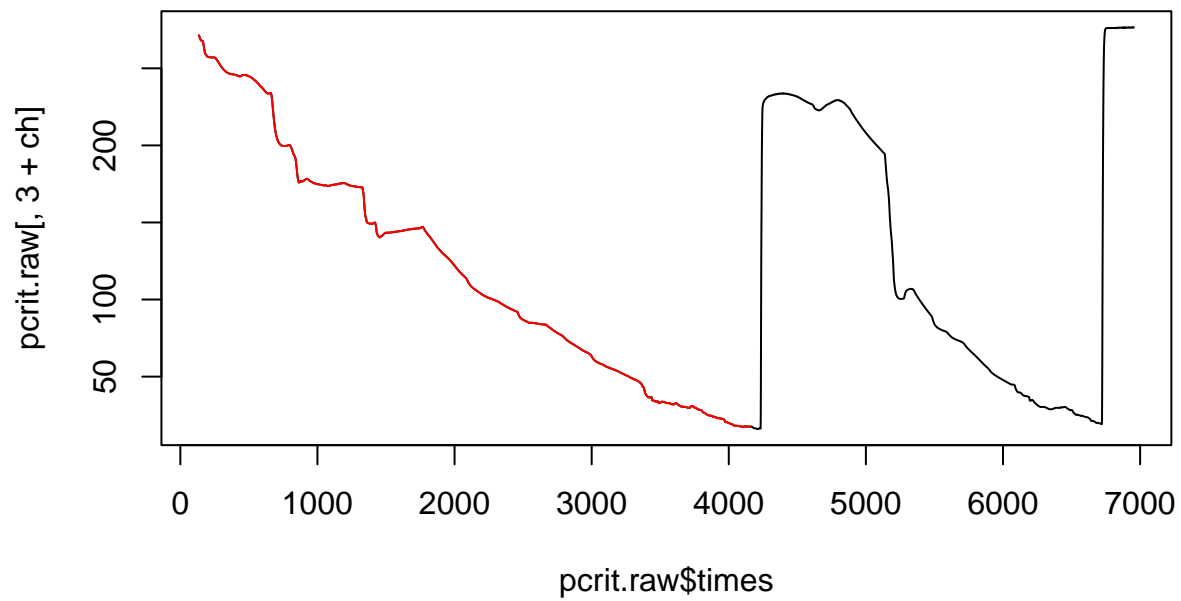
NLR () = NA

Sub-PI =



"MR" must be defined for LLO calculation.

gr2muus1800-2 pcrit in 25 ml jar 7-29-21 ch2 is blank.txt



"MR" must be defined for LLO calculation.

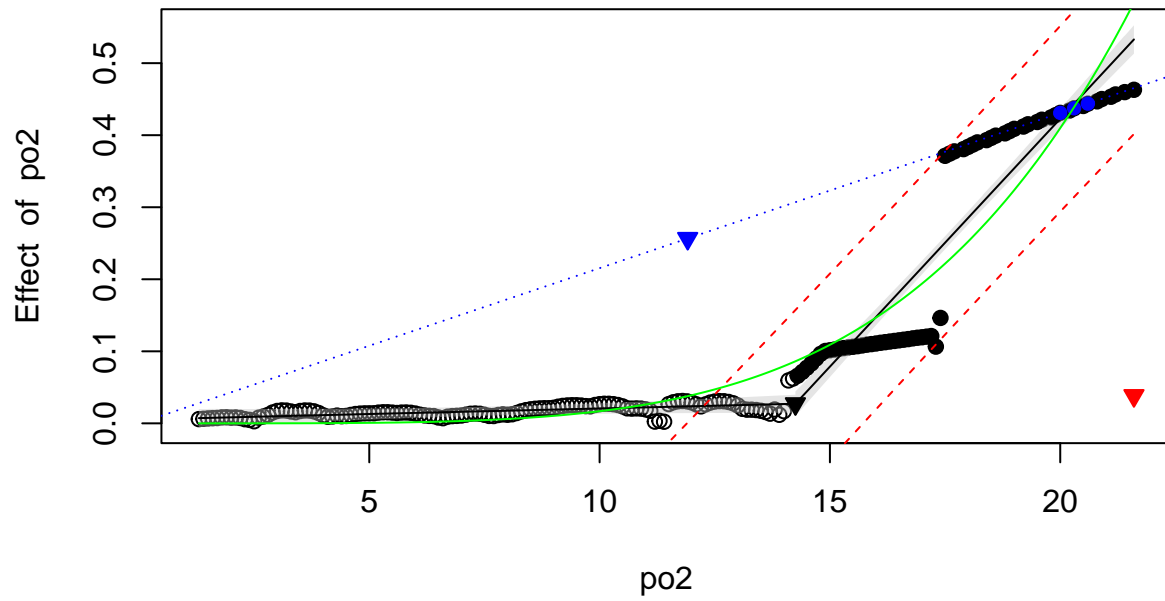
Alpha @ MR of 0.26 = 11.912

Breakpoint = 14.251

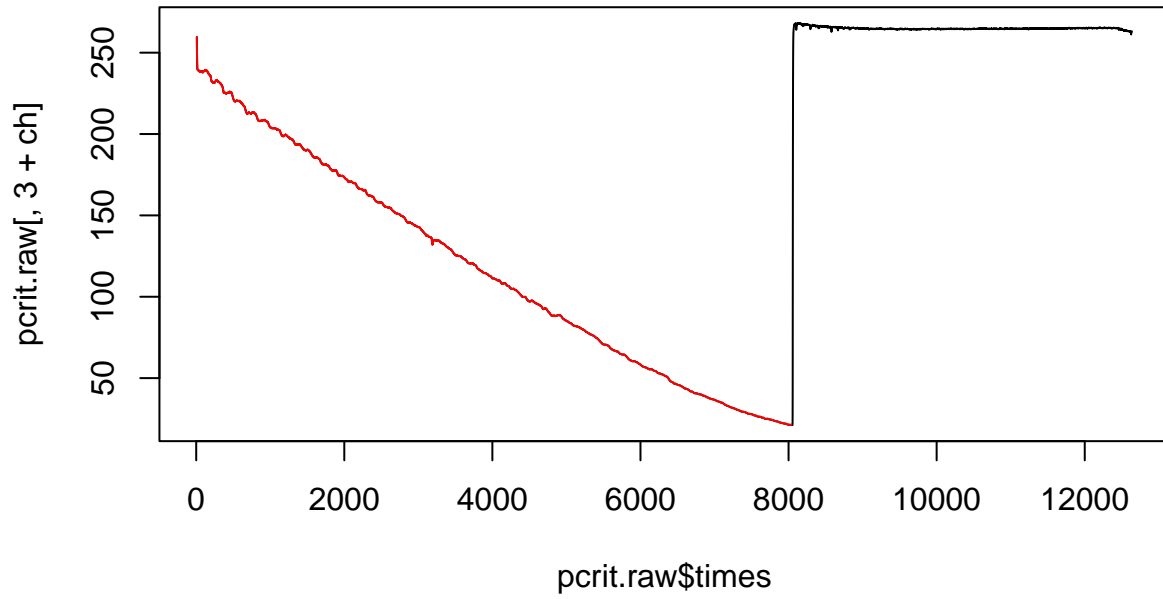
LLO @ MR of NA = NA

NLR (Power) = 32.693

Sub-PI = 21.6



Gr3 Muus 1000 pcrit 7-21-21.txt



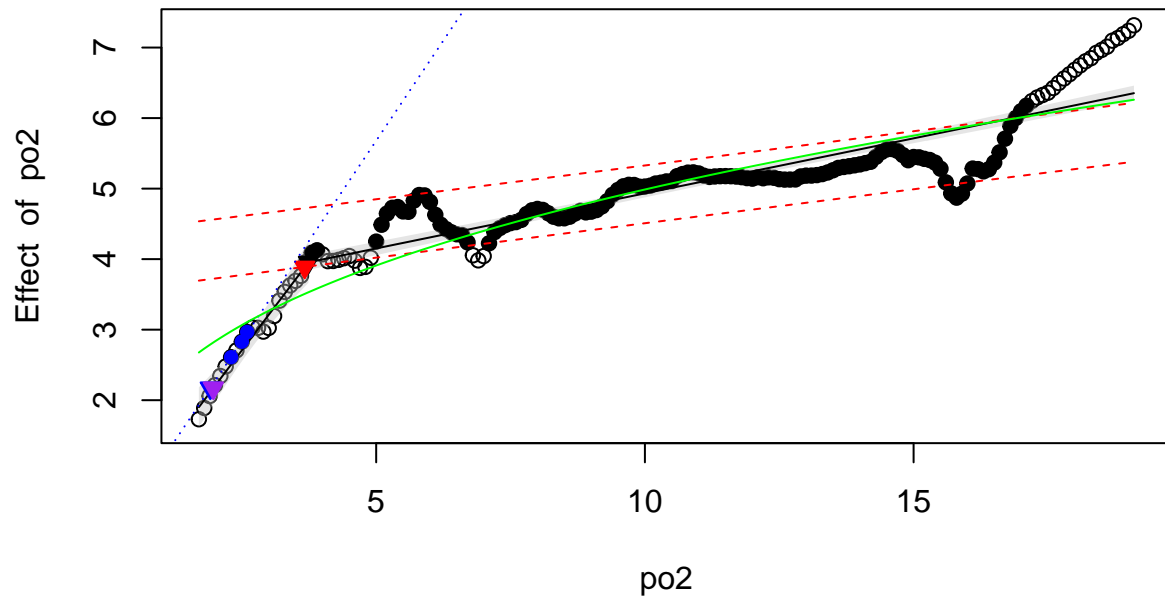
Alpha @ MR of 2.17 = 1.913

Breakpoint = 3.739

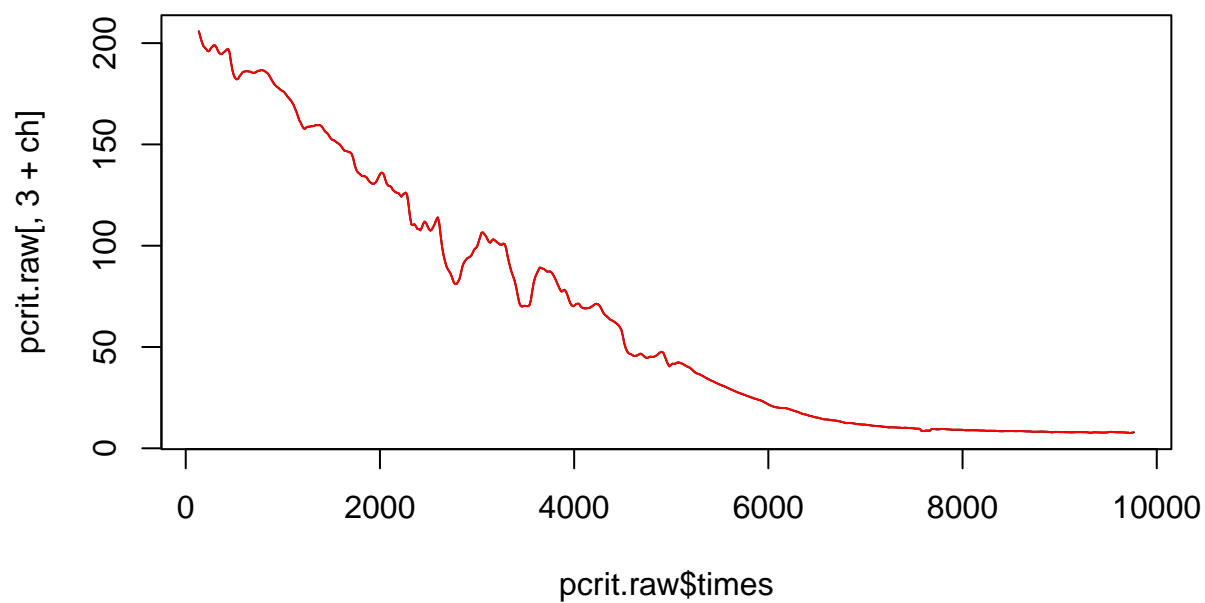
LLO @ MR of 2.17 = 1.97

NLR (Power) = 67.766

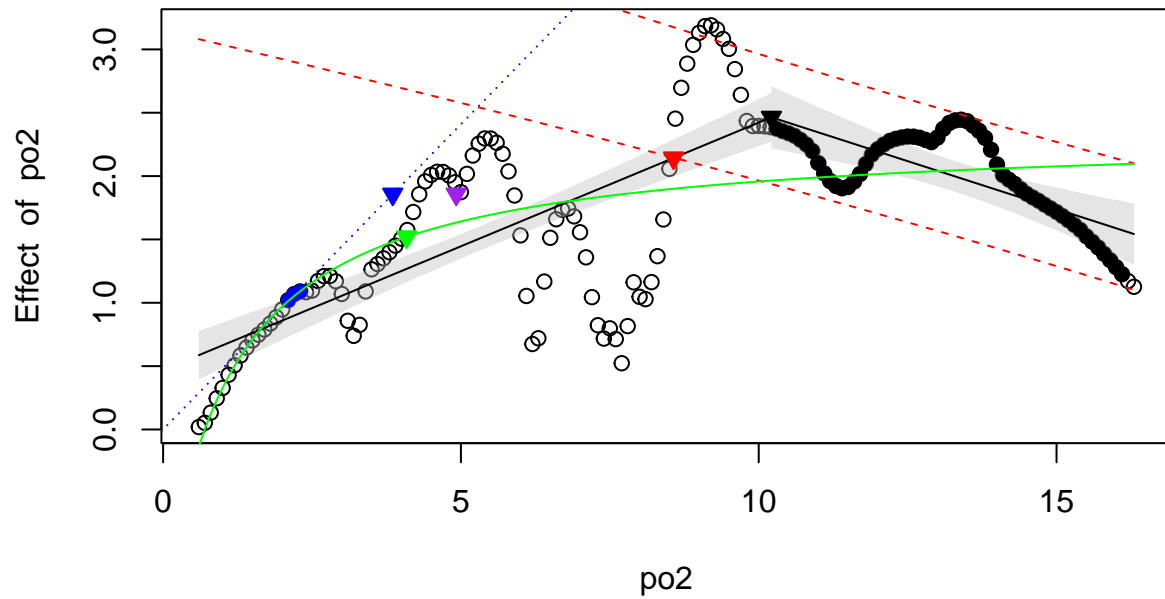
Sub-PI = 3.67



gr3 muus 1800 7day Pcrit 7-20-21.txt

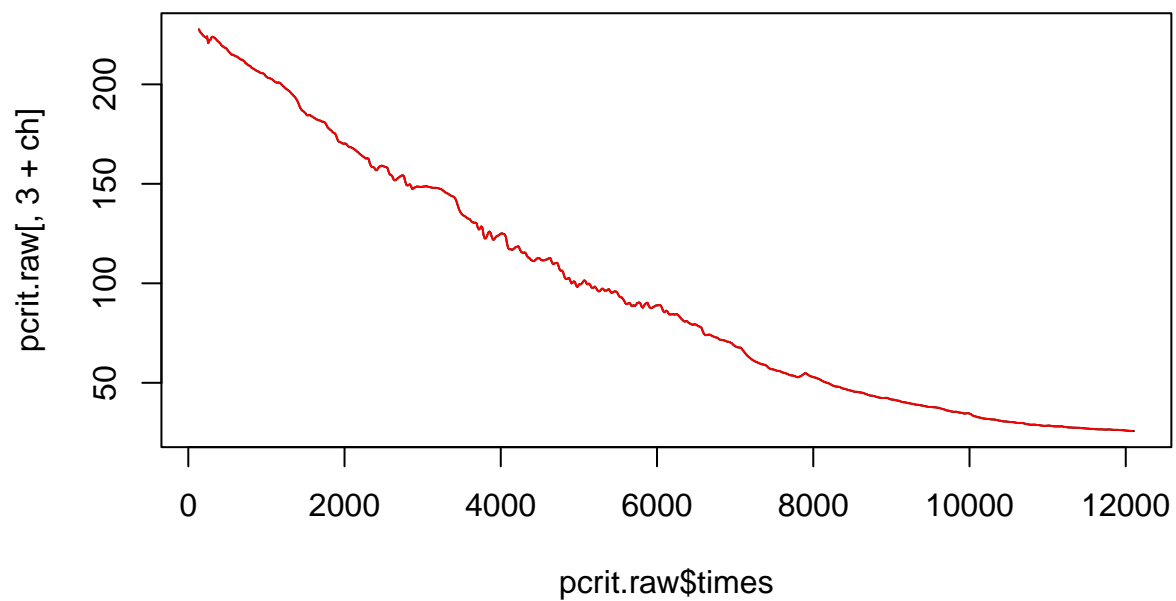


Alpha @ MR of 1.86 = 3.855
 Breakpoint = 10.214
 LLO @ MR of 1.86 = 4.921
 NLR (Hyperbola) = 4.09
 Sub-PI = 8.57



"MR" must be defined for LLO calculation.

gr3 muus 1800 pcrit 7-13-21.txt



"MR" must be defined for LLO calculation.

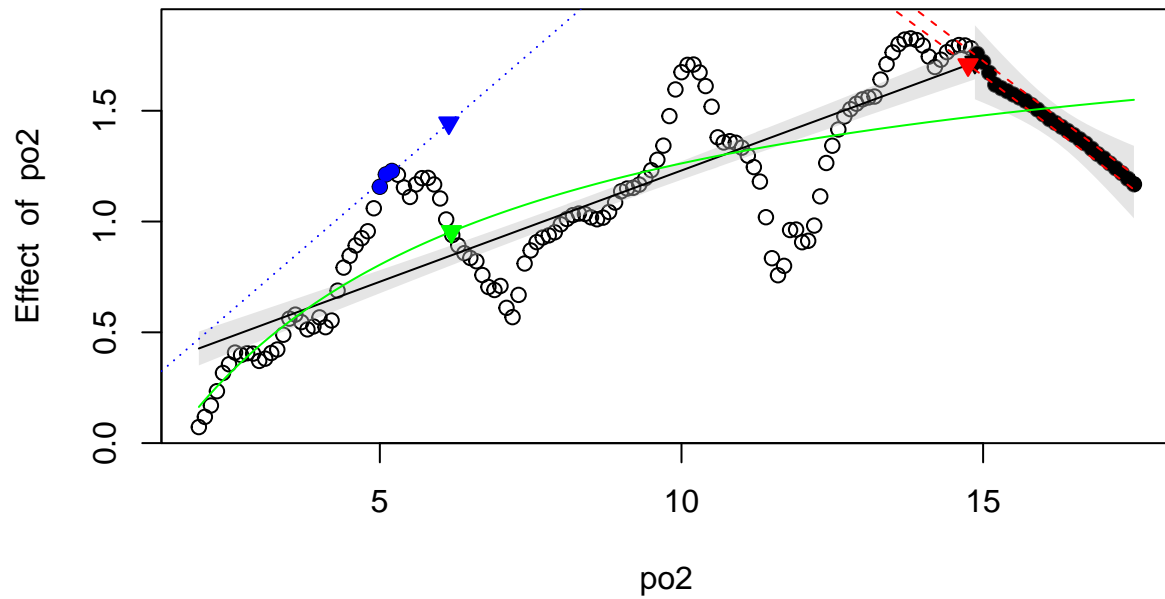
Alpha @ MR of 1.44 = 6.145

Breakpoint = 14.864

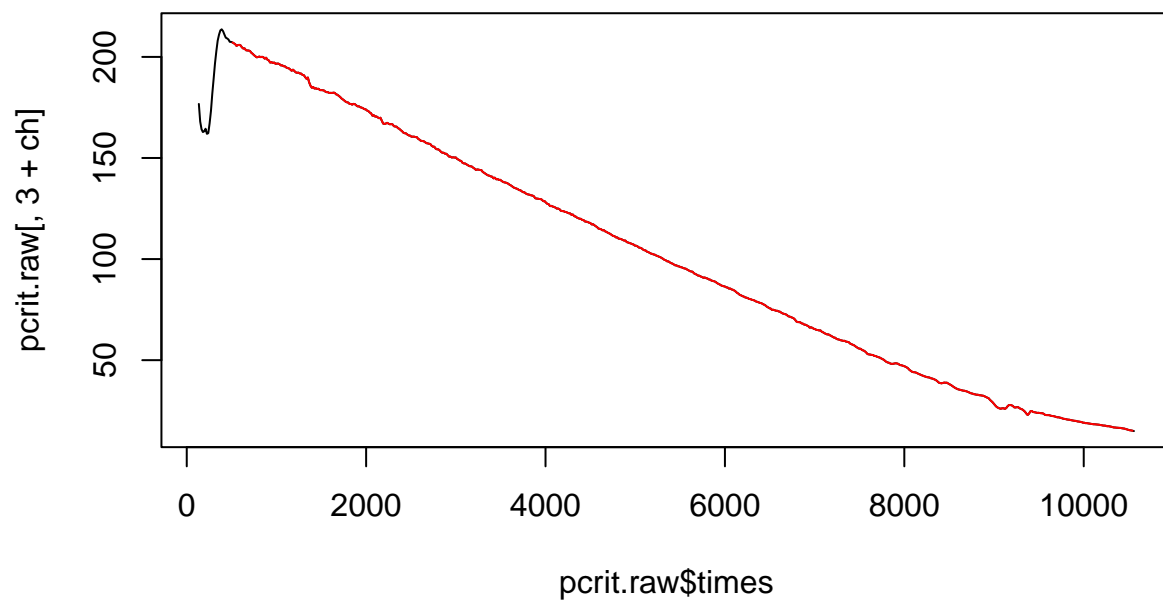
LLO @ MR of NA = NA

NLR (Hyperbola) = 6.188

Sub-PI = 14.75



Gr3 Muus 1800-2 pcrit 07-28-21.txt



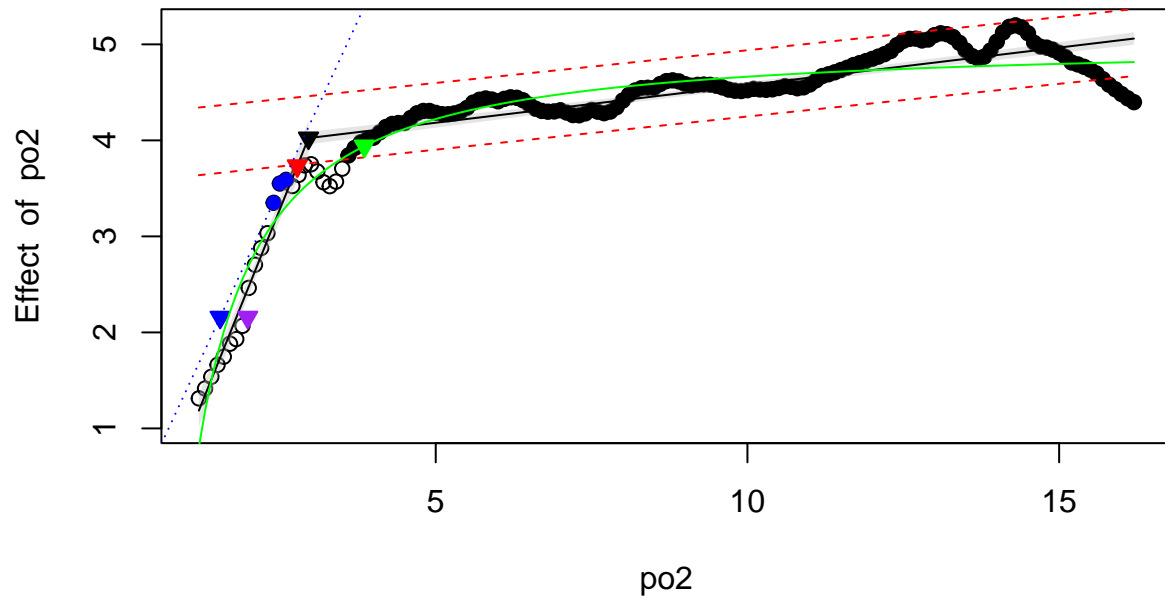
Alpha @ MR of 2.16 = 1.542

Breakpoint = 2.959

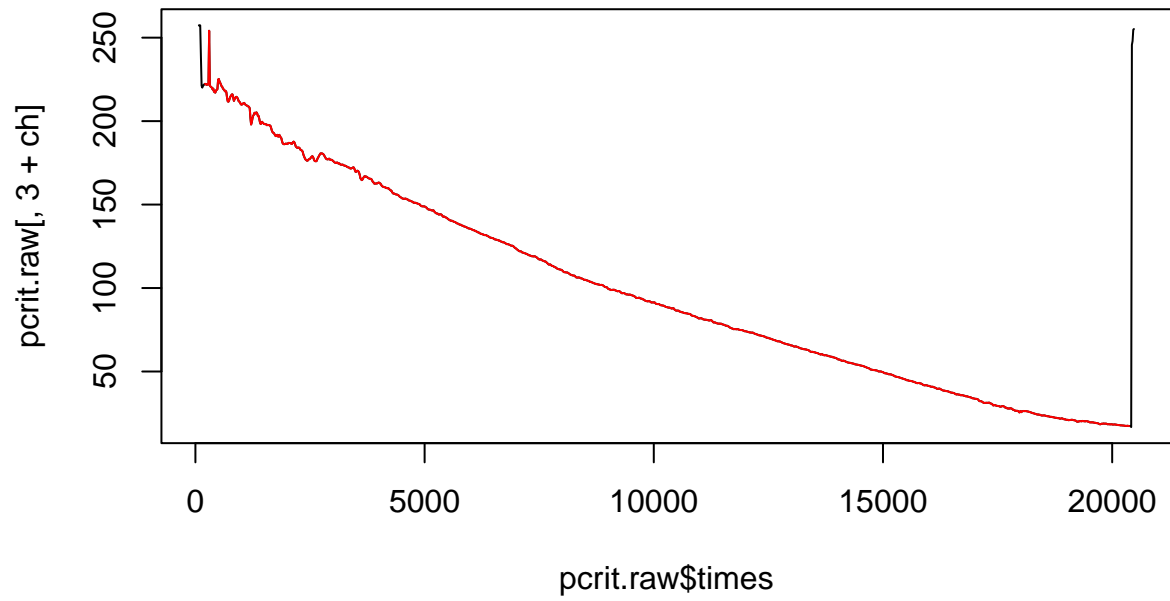
LLO @ MR of 2.16 = 1.983

NLR (Pareto) = 3.857

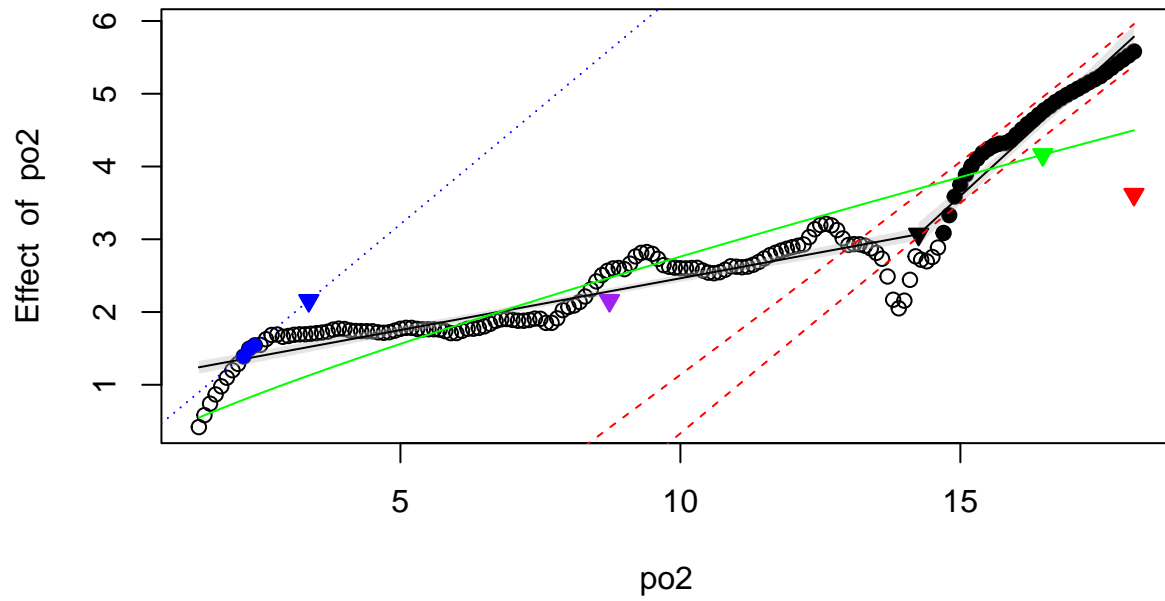
Sub-PI = 2.78



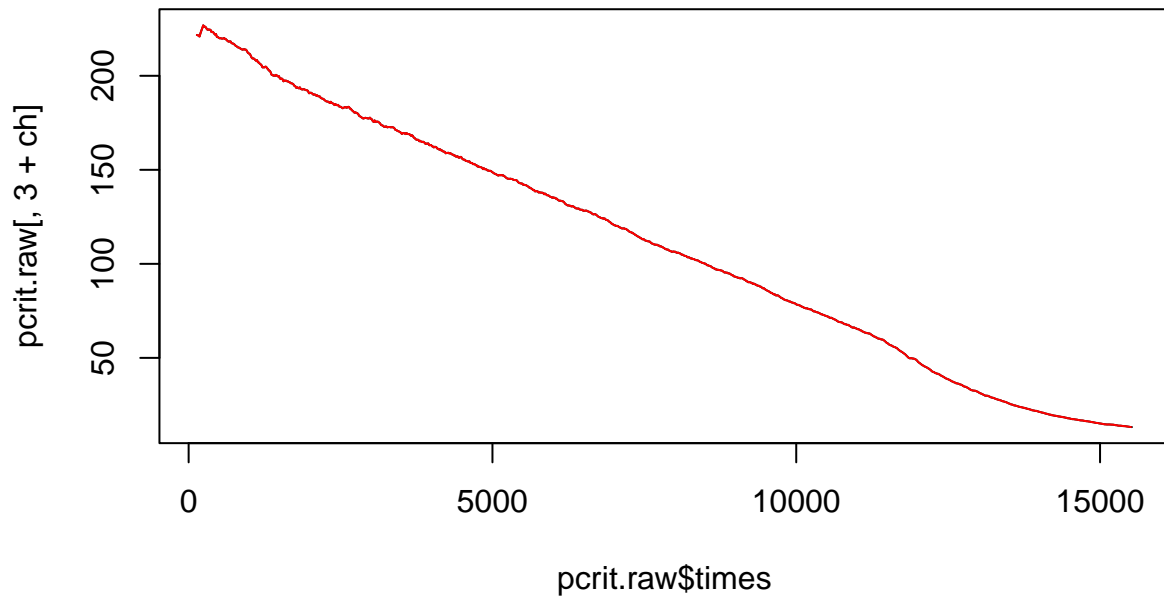
Gr3 Muus 1800-2 pcrit 08-03-21.txt



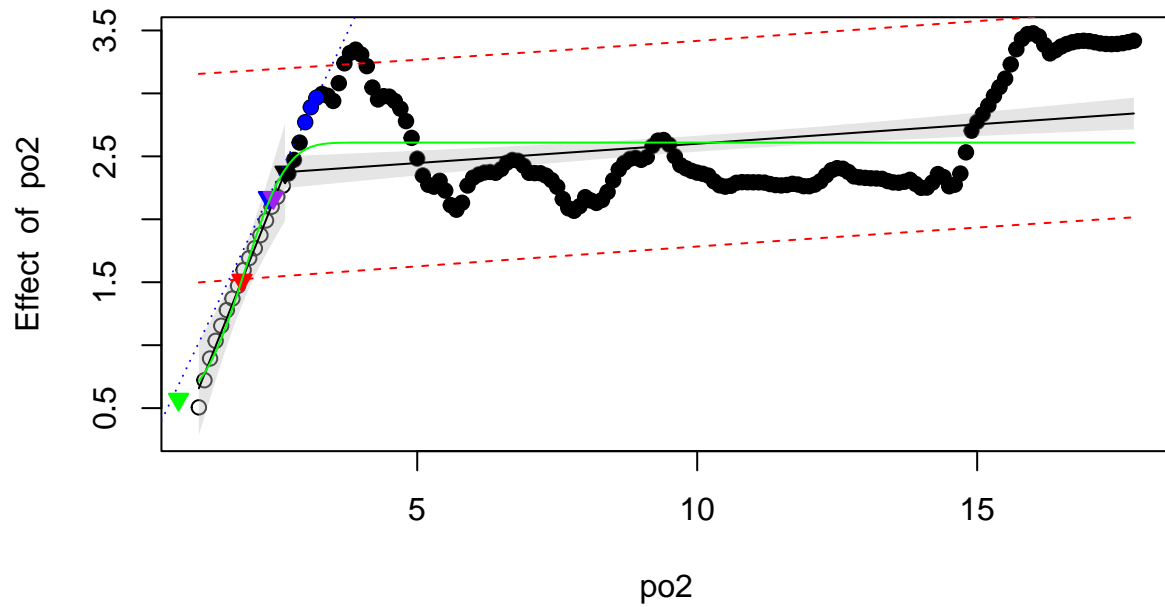
Alpha @ MR of 2.16 = 3.363
Breakpoint = 14.254
LLO @ MR of 2.16 = 8.734
NLR (Power) = 16.472
Sub-PI = 18.1



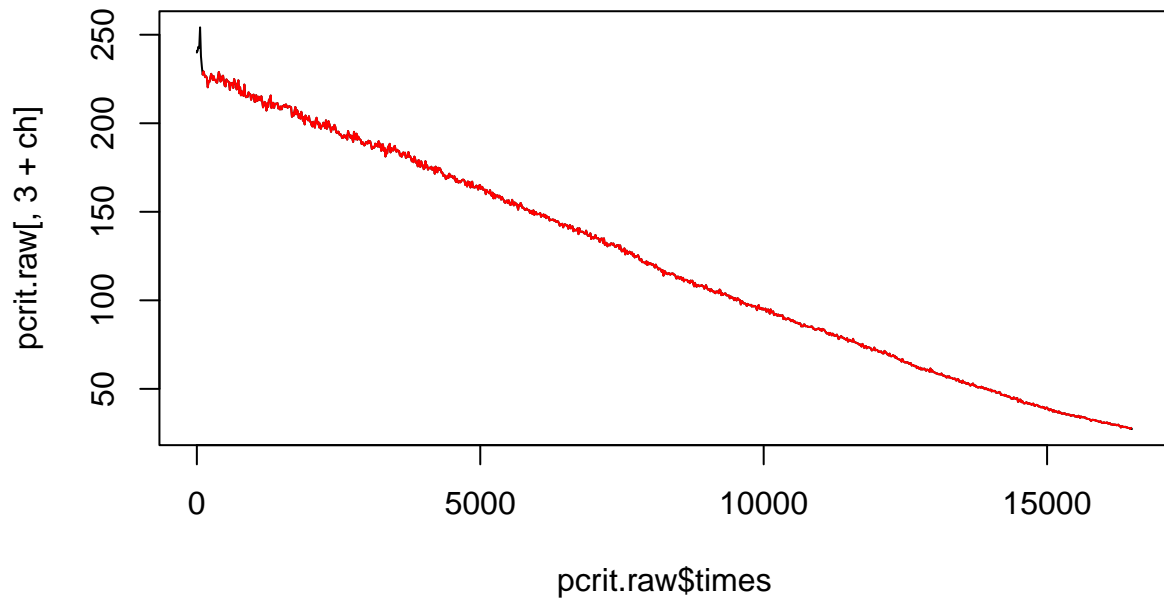
Gr3 Muus1000-2 7 day pcrit 7-27-21.txt



Alpha @ MR of 2.17 = 2.342
Breakpoint = 2.64
LLO @ MR of 2.17 = 2.43
NLR (Weibull with intercept) = 0.737
Sub-PI = 1.87



GR4MUUS1000-2Pcrit-7-26-21-ch1.txt



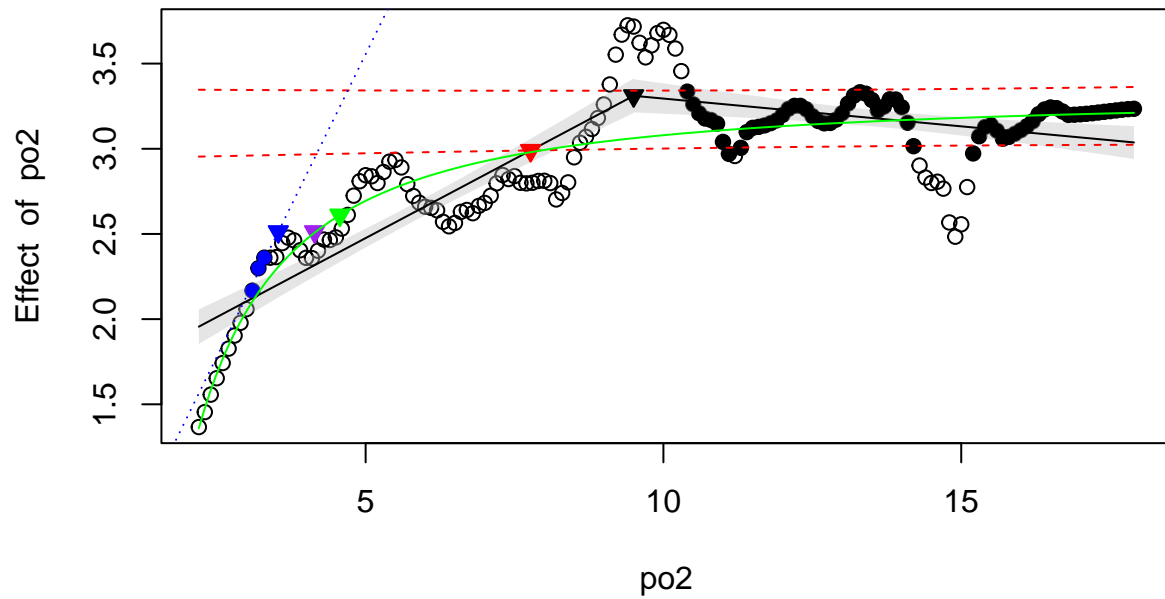
Alpha @ MR of 2.51 = 3.535

Breakpoint = 9.5

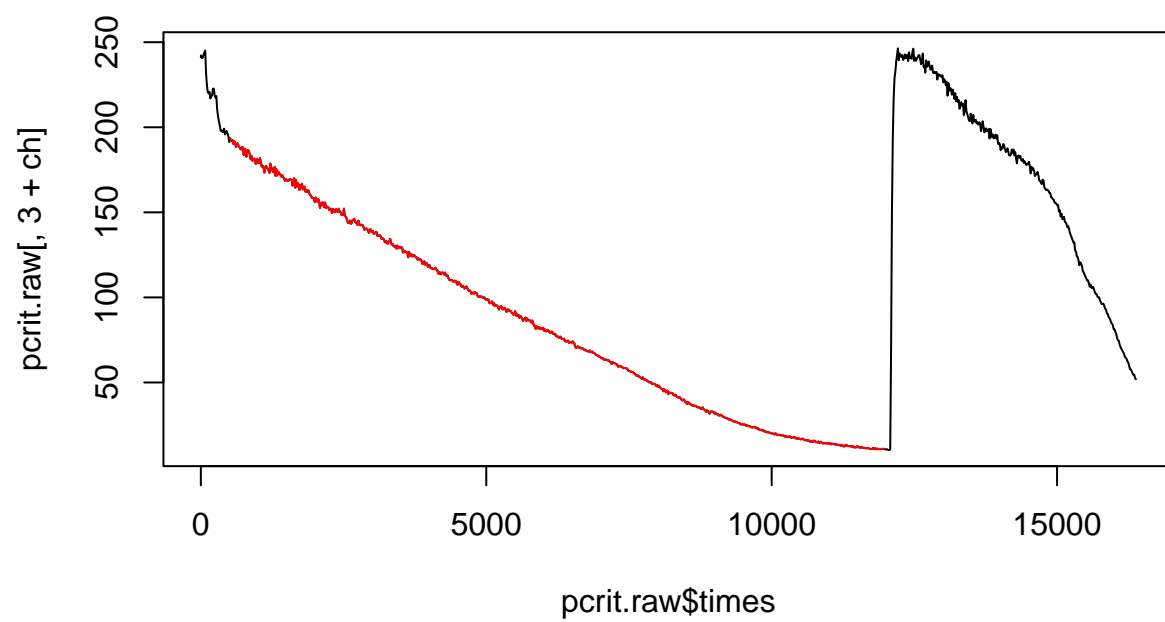
LLO @ MR of 2.51 = 4.144

NLR (Pareto) = 4.568

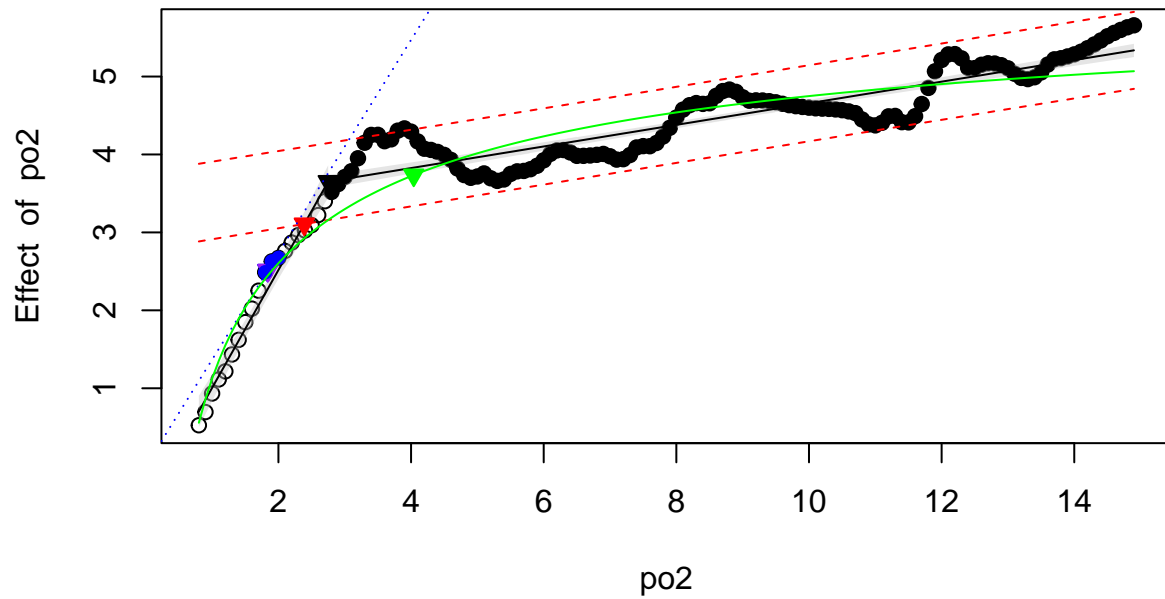
Sub-PI = 7.77



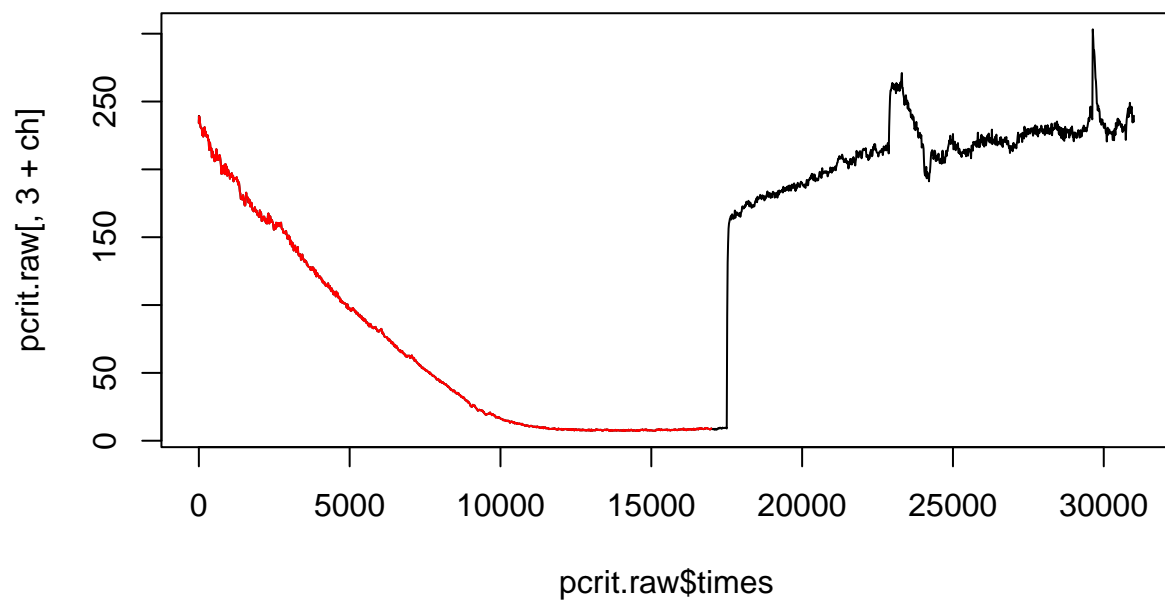
GR4MUUS1000Pcrit-7-21-21-ch1.txt



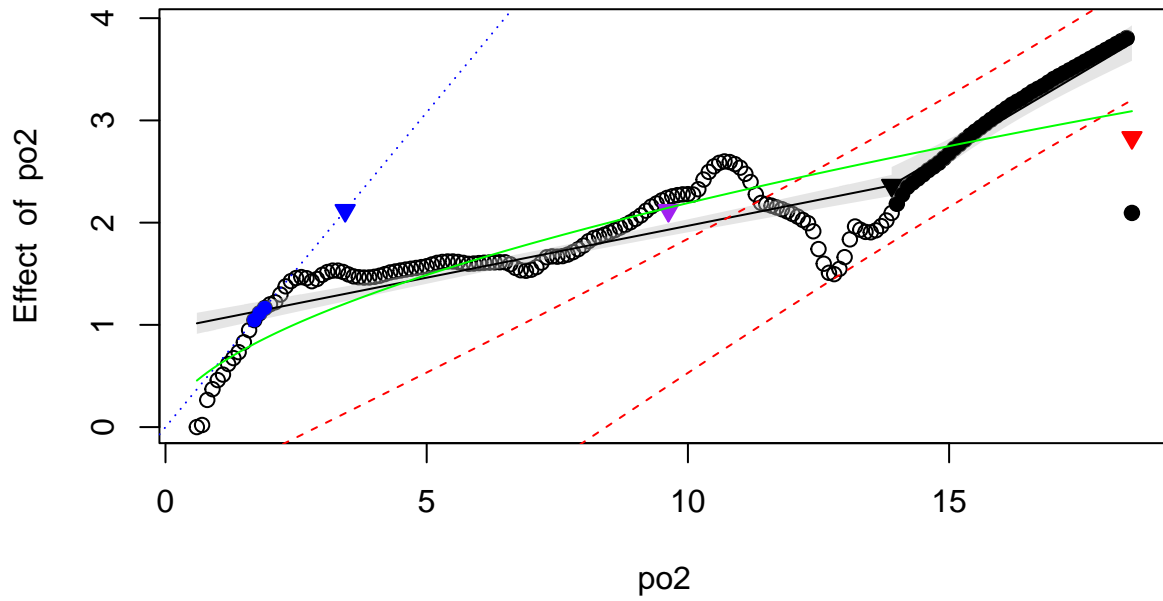
Alpha @ MR of 2.51 = 1.838
Breakpoint = 2.75
LLO @ MR of 2.51 = 1.843
NLR (Weibull with intercept) = 4.04
Sub-PI = 2.39



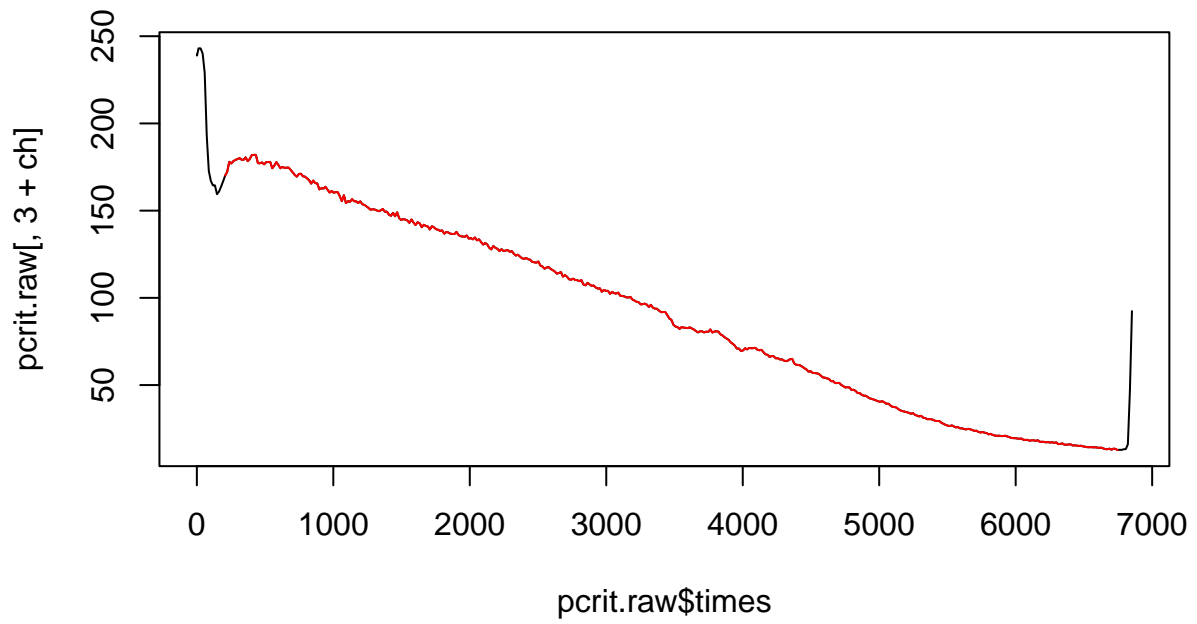
GR4MUUS1800-2-7dayPcrit-8-3-21-ch1.txt



Alpha @ MR of 2.12 = 3.44
 Breakpoint = 13.9
 LLO @ MR of 2.12 = 9.627
 NLR (Power) = 39.697
 Sub-PI = 18.5



GR4MUUS1800-2Pcrit-7-28-21-ch1.txt



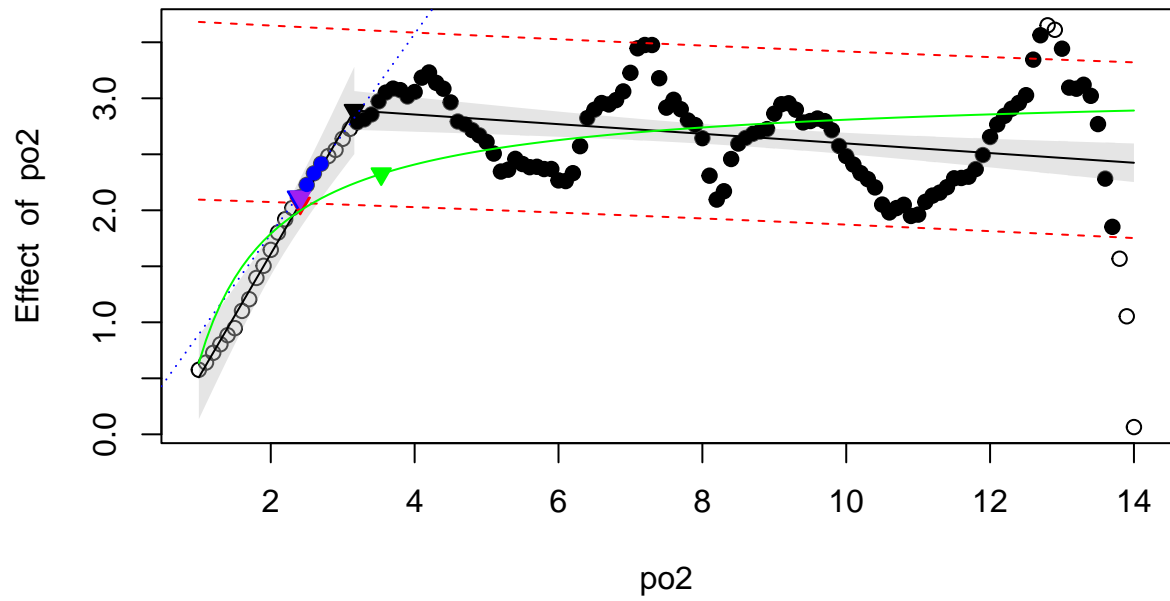
Alpha @ MR of 2.12 = 2.37

Breakpoint = 3.161

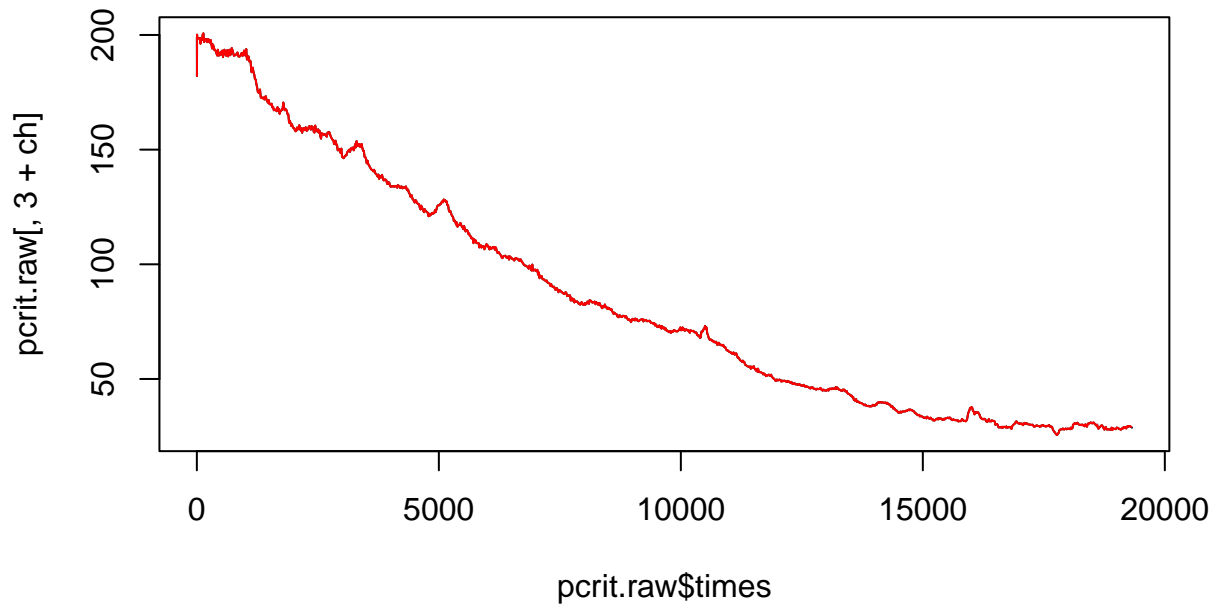
LLO @ MR of 2.12 = 2.413

NLR (Pareto) = 3.535

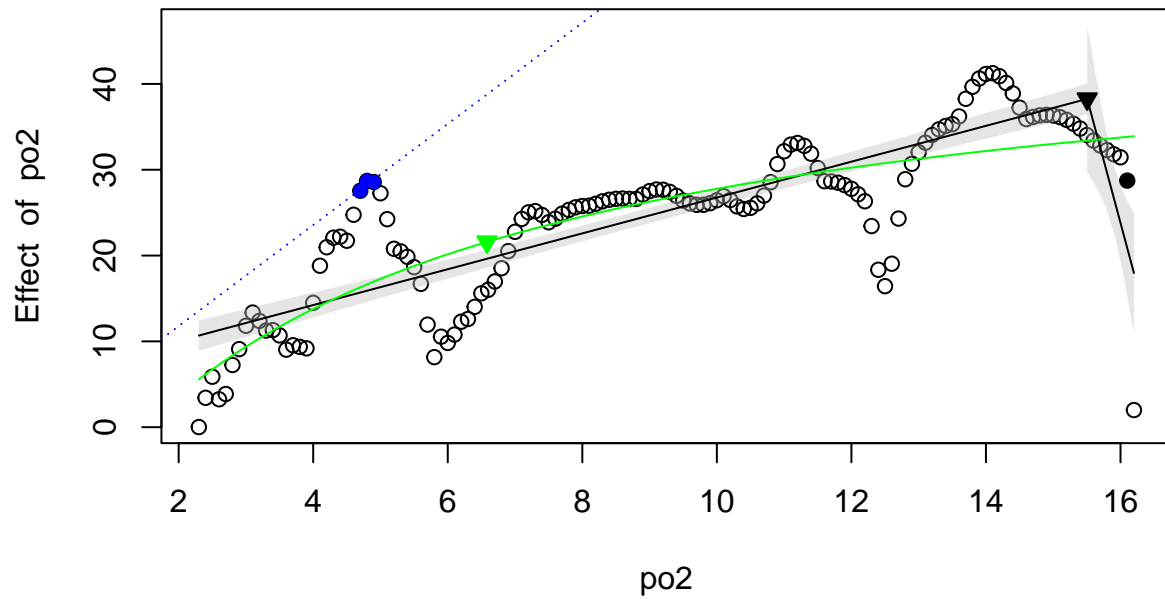
Sub-PI = 2.41



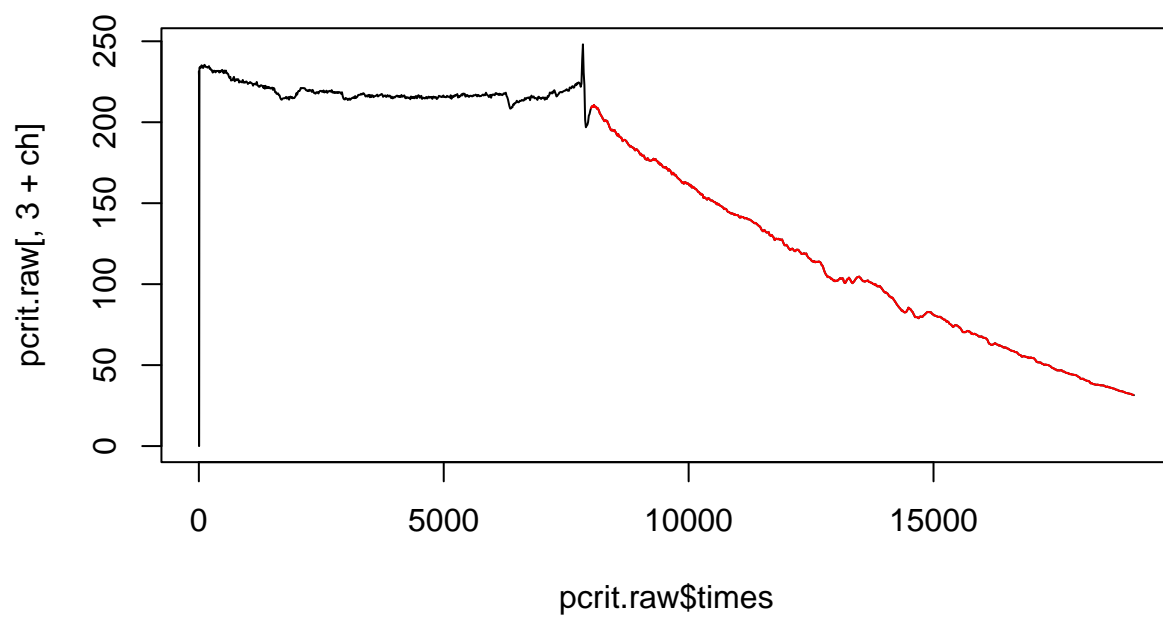
GR4MUUS1800-7dayPcrit-7-20-21-ch1.txt



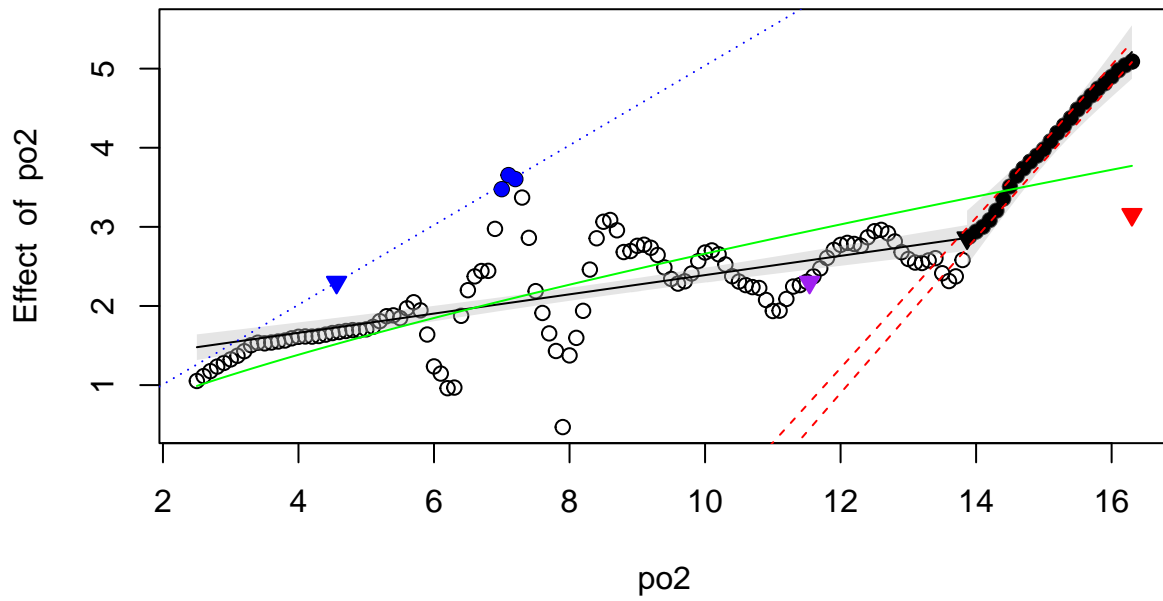
Alpha @ MR of 2.3 = 0.39
Breakpoint = 15.505
LLO @ MR of 2.3 = NA
NLR (Hyperbola) = 6.583
Sub-PI =



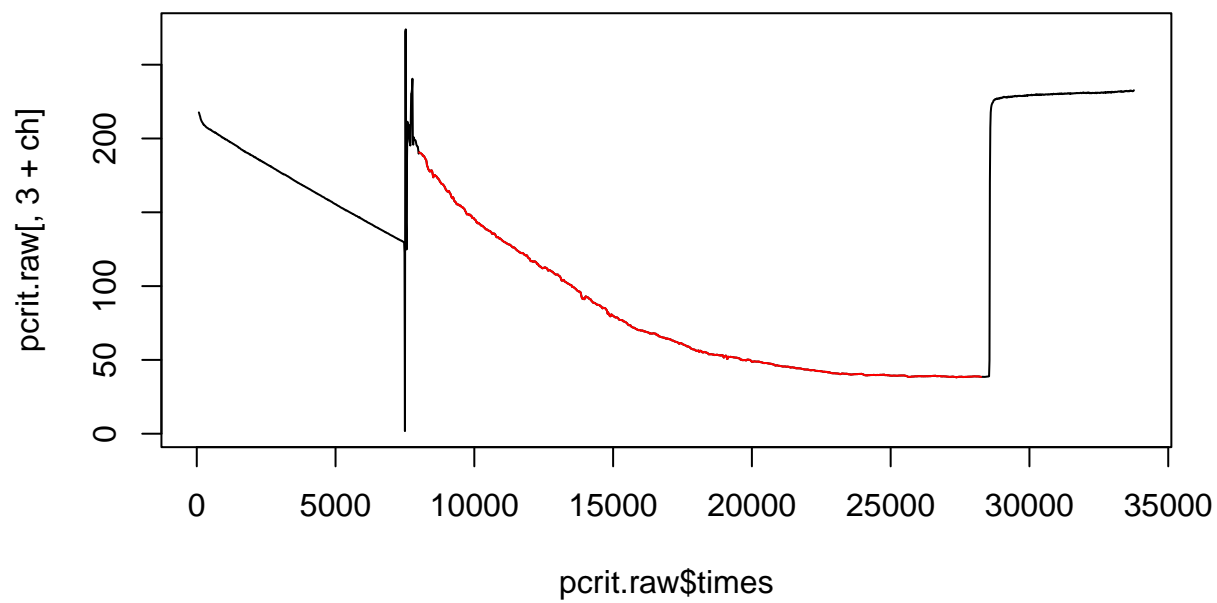
GR4MUUS1800Pcrit-7-13-21-ch1.txt



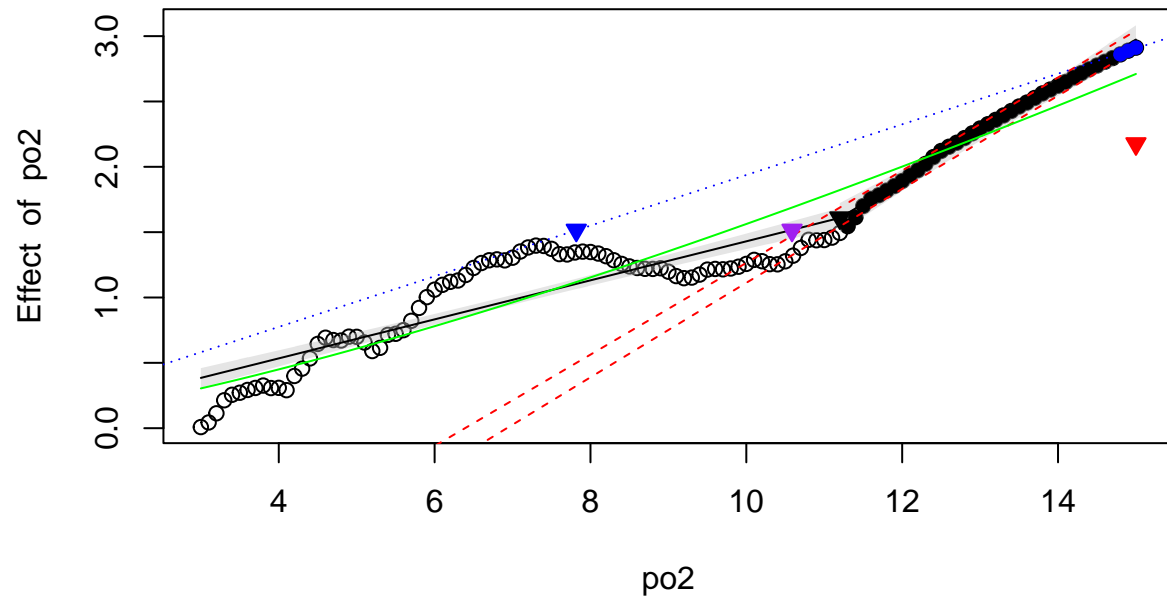
Alpha @ MR of 2.3 = 4.562
Breakpoint = 13.867
LLO @ MR of 2.3 = 11.542
NLR (Power) = 37.94
Sub-PI = 16.3



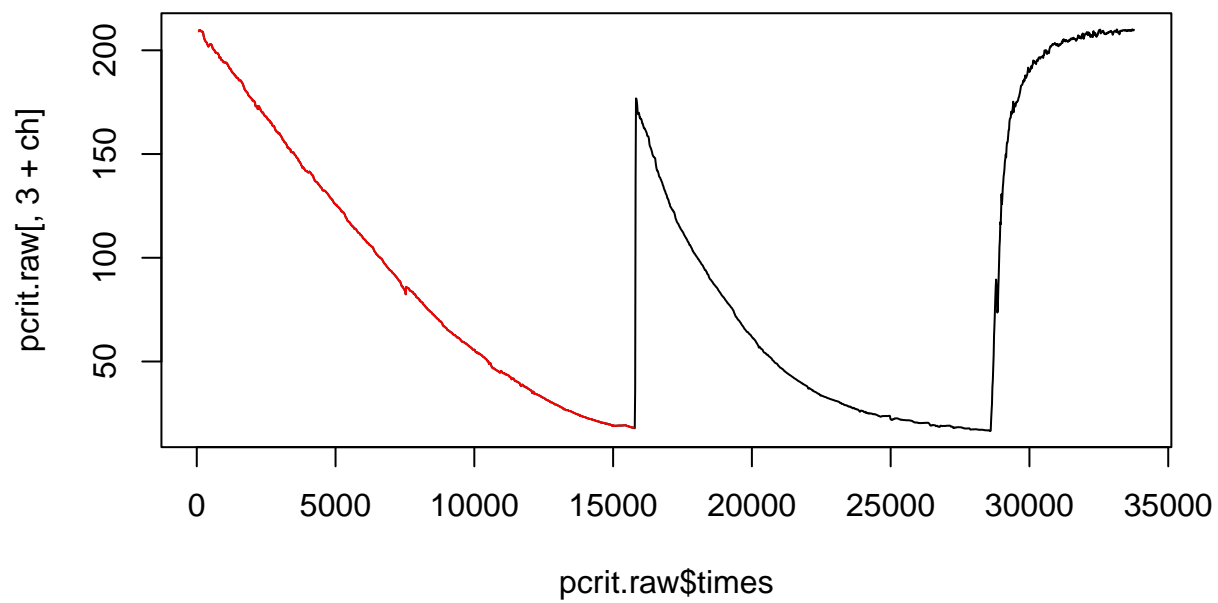
tbocto 1000 pcrit tank 1 and 2 day 7 8–19–21.txt



Sub-PI = 15

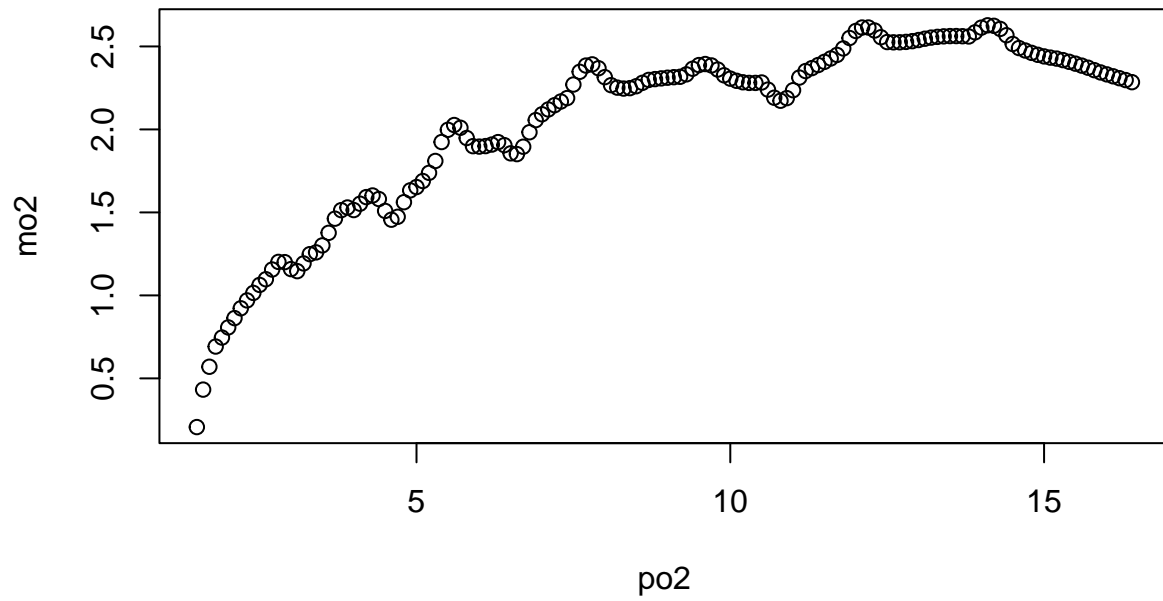


tbacto 1000 pcrit tank 1 and 2 day 7 8-19-21.txt



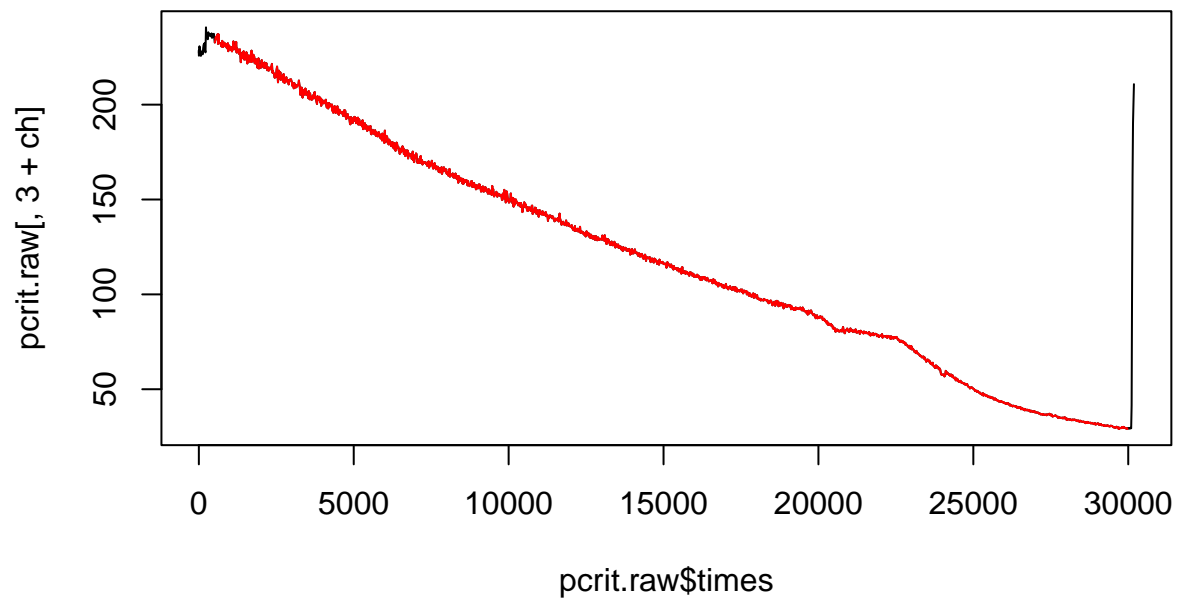
"MR" must be defined for LLO calculation.

Could not calculate a Pcrit. Plotting just the values...



"MR" must be defined for LLO calculation.

tbocto 1000 pcrit tank 3 and 4 8-11-21-ch1.txt



```
## "MR" must be defined for LLO calculation.
```

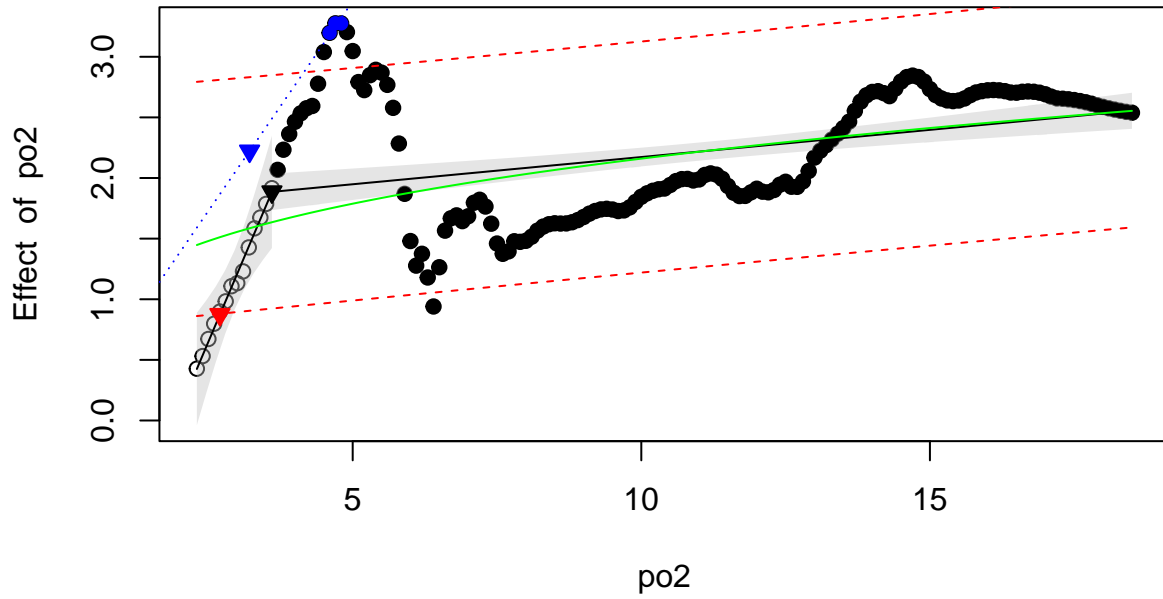
Alpha @ MR of 2.22 = 3.214

Breakpoint = 3.601

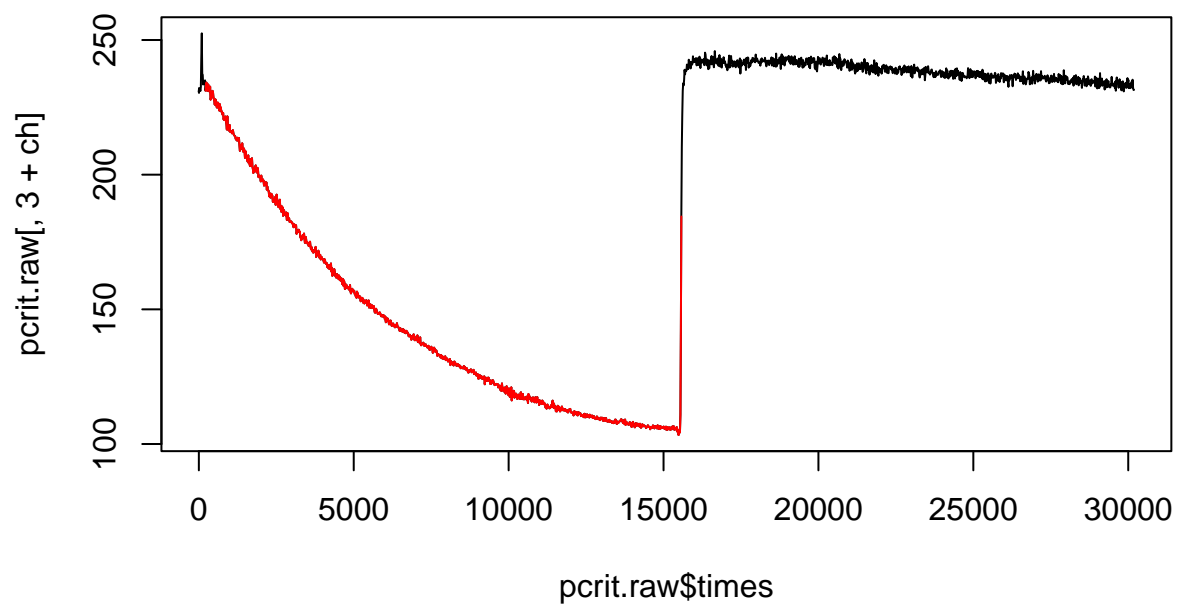
LLO @ MR of NA = NA

NLR (Power) = 77.005

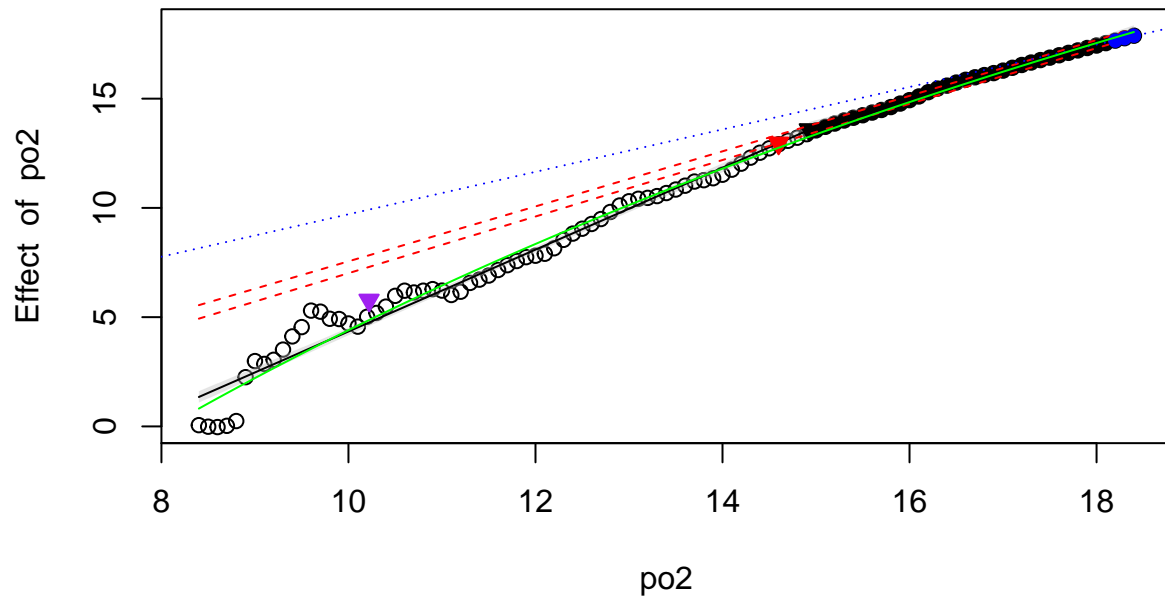
Sub-PI = 2.7



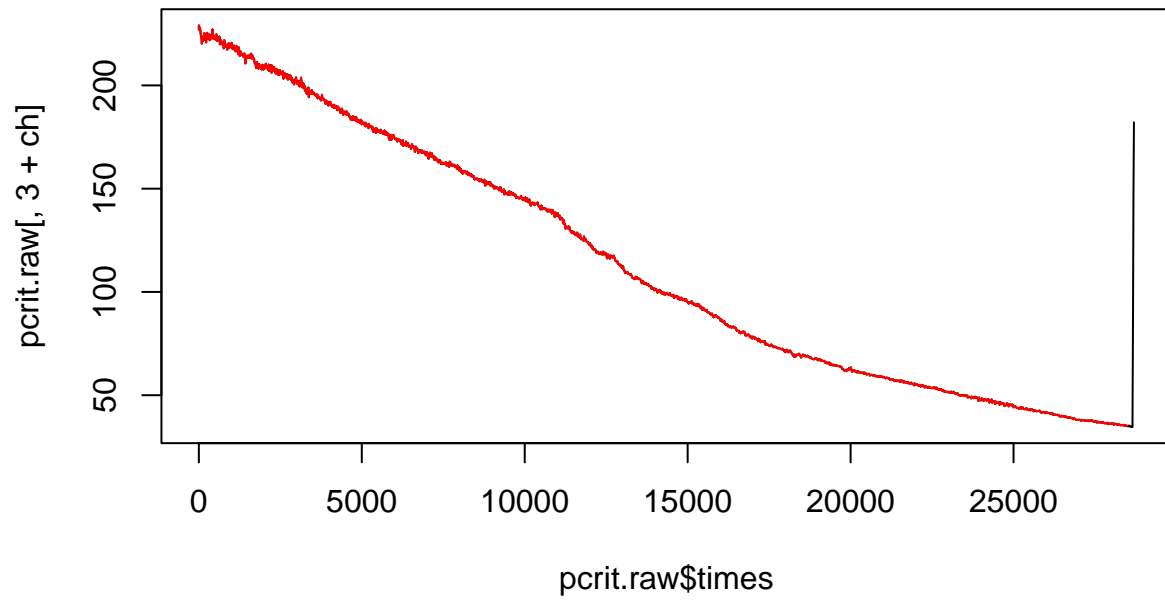
tbocto 1000 pcrit tank 3 and 4 8-11-21-ch1.txt



Alpha @ MR of 5.78 = 5.948
 Breakpoint = 14.928
 LLO @ MR of 5.78 = 10.22
 NLR (Hyperbola) = 20.952
 Sub-PI = 14.6



tbocto 1000 pcrit tank 3 and 4 day 7 8-19-21-ch1.txt



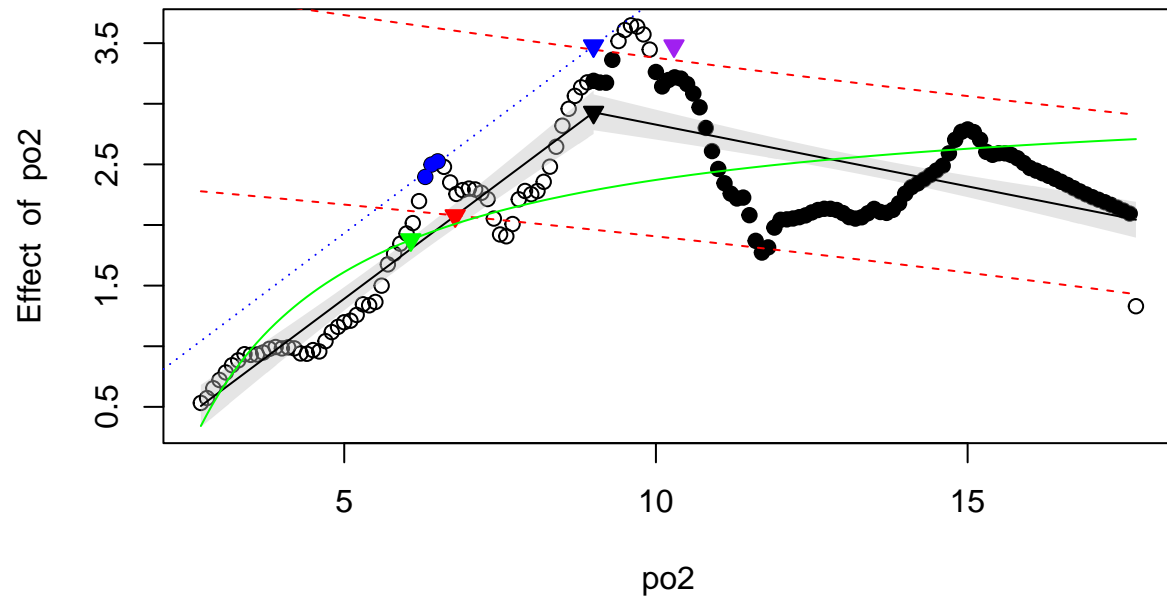
Alpha @ MR of 3.48 = 8.999

Breakpoint = 9

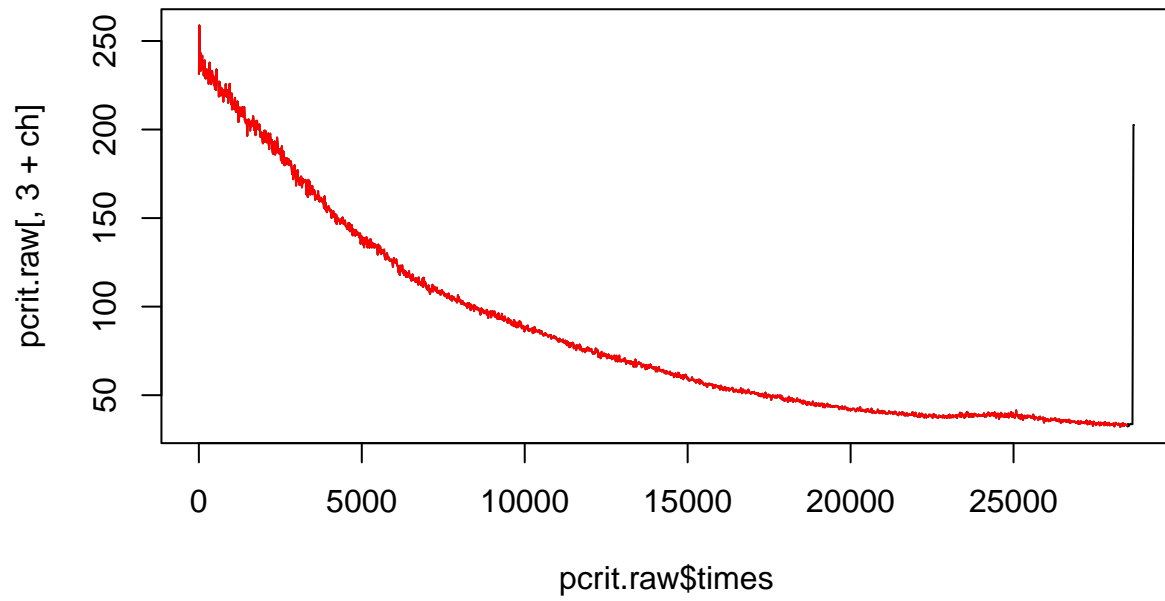
LLO @ MR of 3.48 = 10.289

NLR (Pareto) = 6.069

Sub-PI = 6.78



tbocto 1000 pcrit tank 3 and 4 day 7 8-19-21-ch1.txt



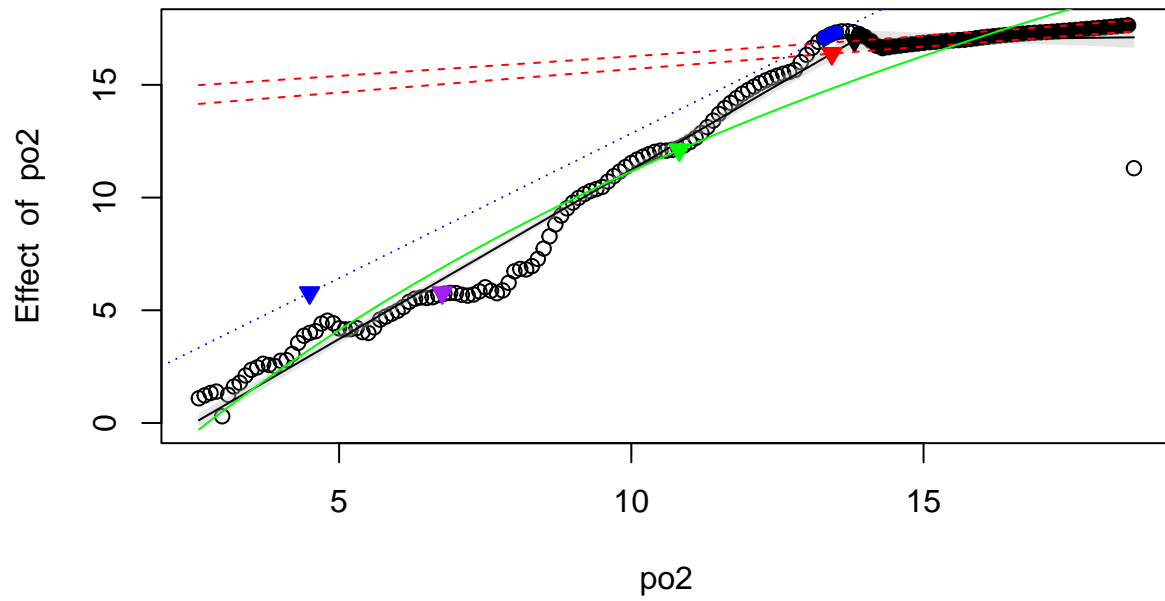
Alpha @ MR of 5.78 = 4.496

Breakpoint = 13.817

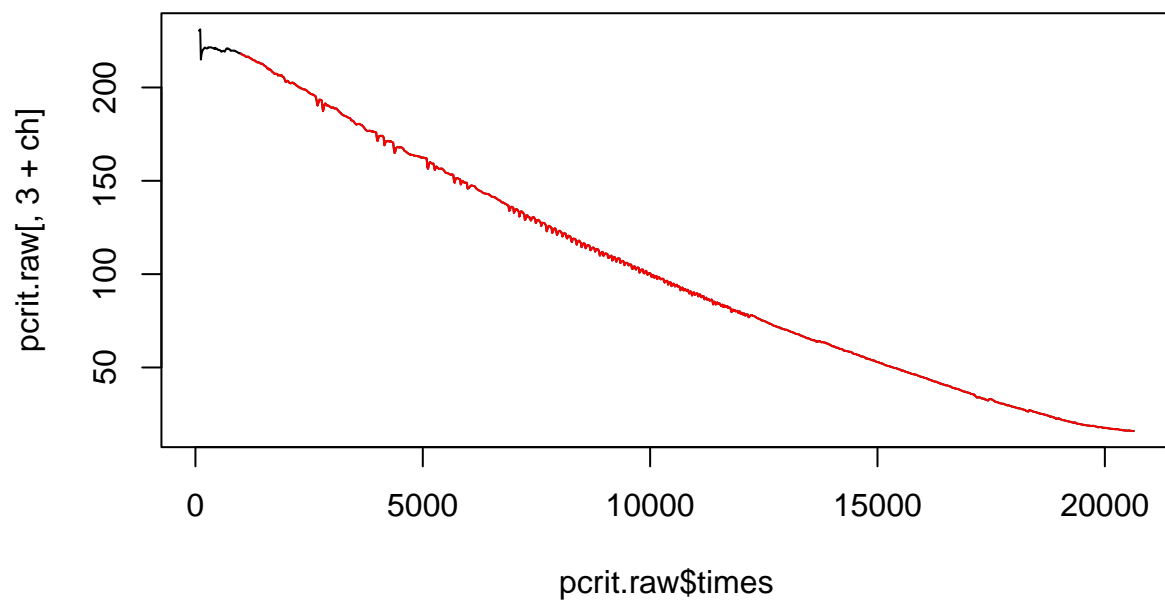
LLO @ MR of 5.78 = 6.765

NLR (Hyperbola) = 10.82

Sub-PI = 13.43



Tbocto 1000 pcrti tank 1 and 2 8-11-21.txt



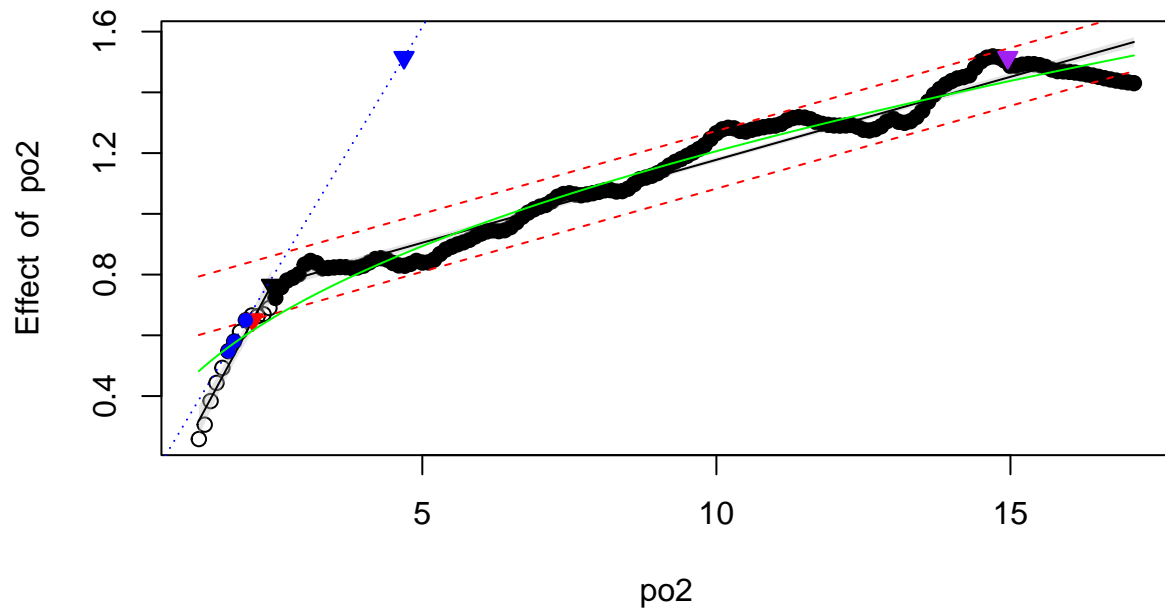
Alpha @ MR of 1.51 = 4.689

Breakpoint = 2.435

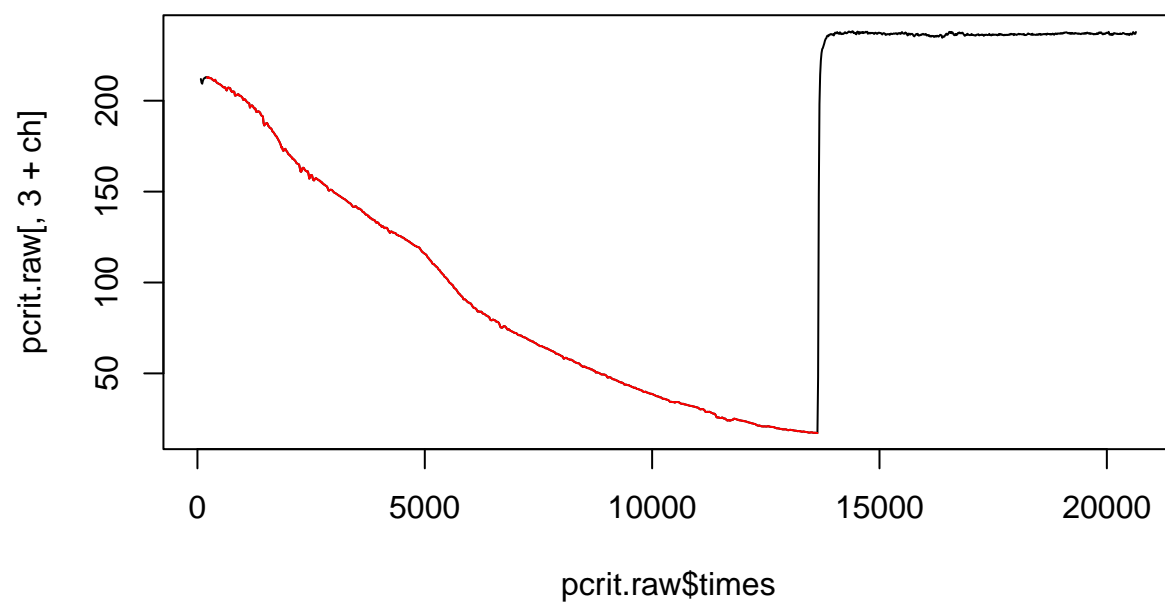
LLO @ MR of 1.51 = 14.954

NLR (Power) = 66.218

Sub-PI = 2.12



Tbocto 1000 pcrti tank 1 and 2 8-11-21.txt



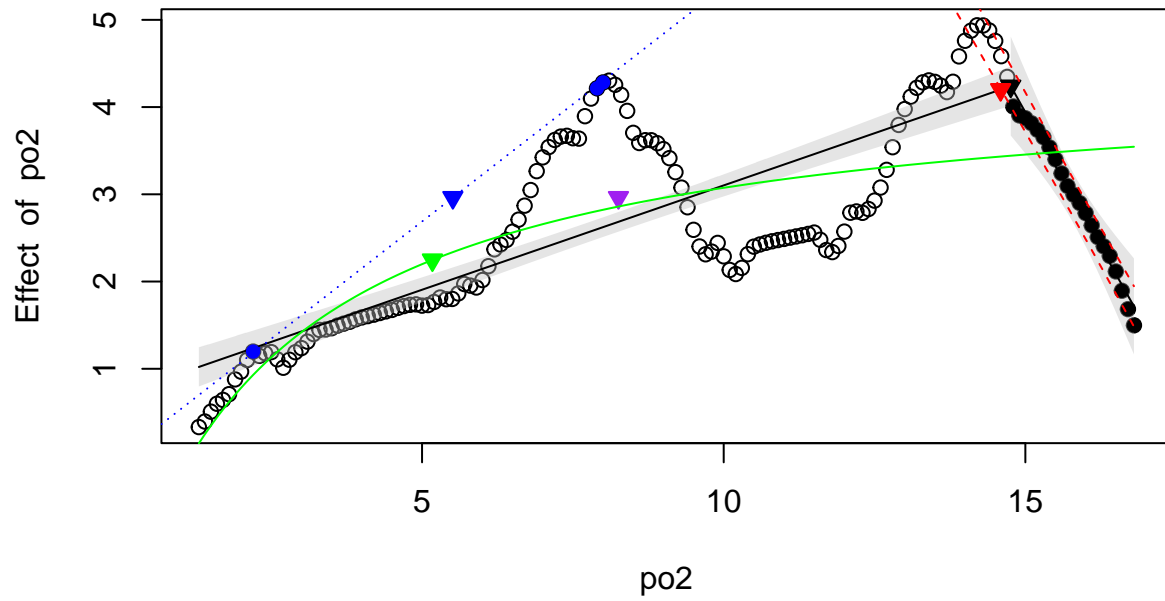
Alpha @ MR of 2.96 = 5.511

Breakpoint = 14.758

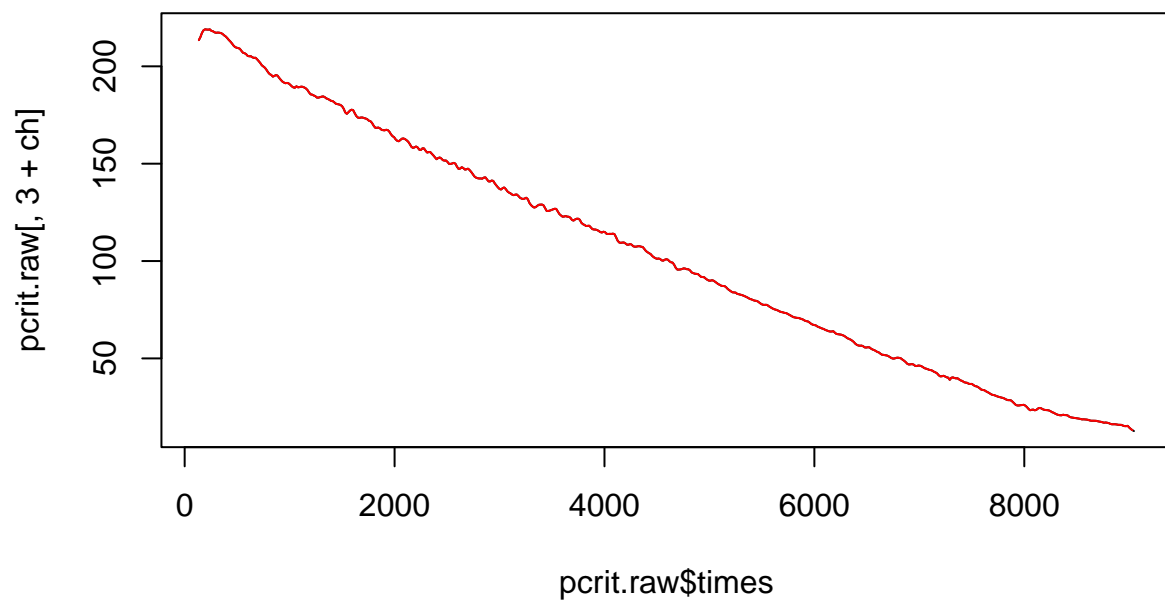
LLO @ MR of 2.96 = 8.255

NLR (Hyperbola) = 5.171

Sub-PI = 14.59



gr2muus1000 pcrit 7-21-21.txt



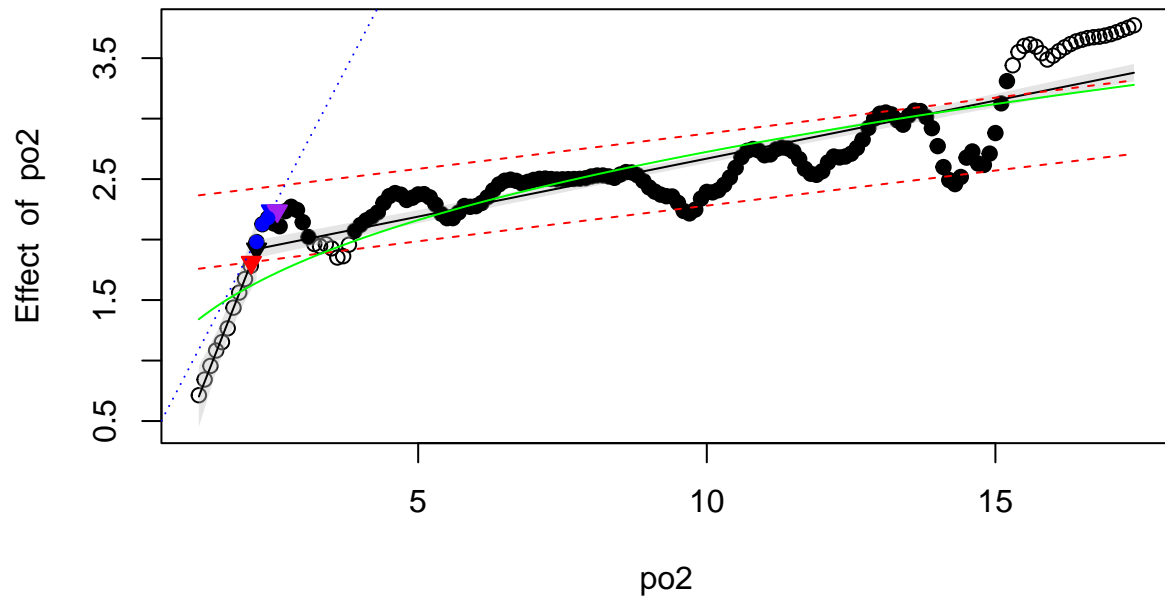
Alpha @ MR of 2.24 = 2.456

Breakpoint = 2.2

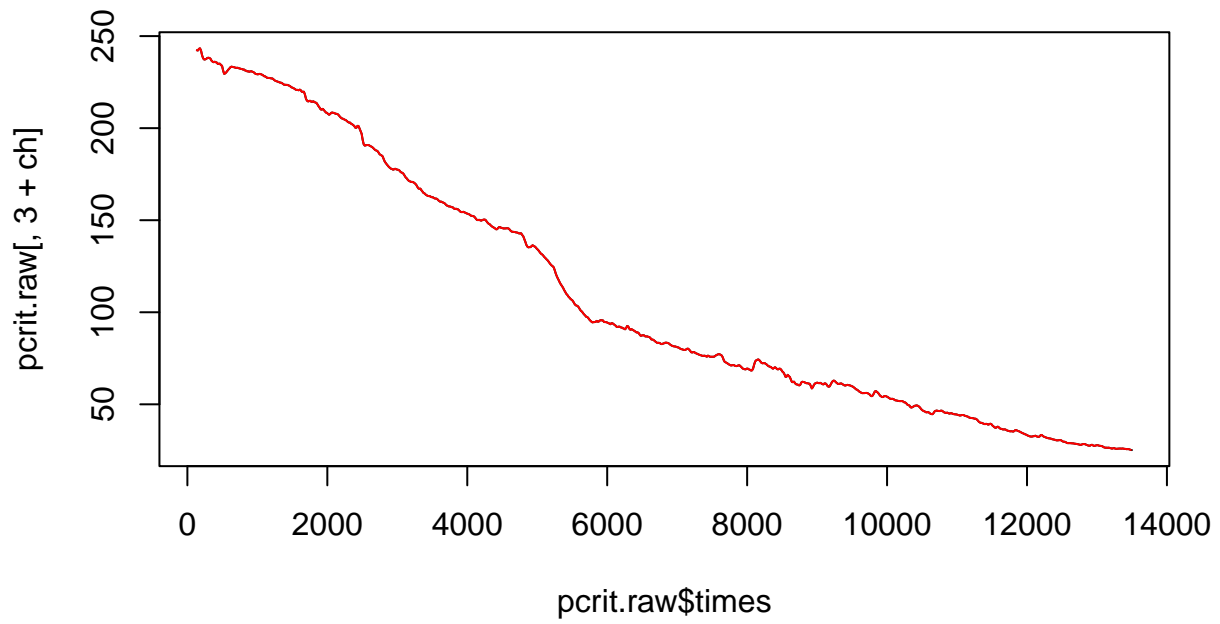
LLO @ MR of 2.24 = 2.559

NLR (Power) = 66.42

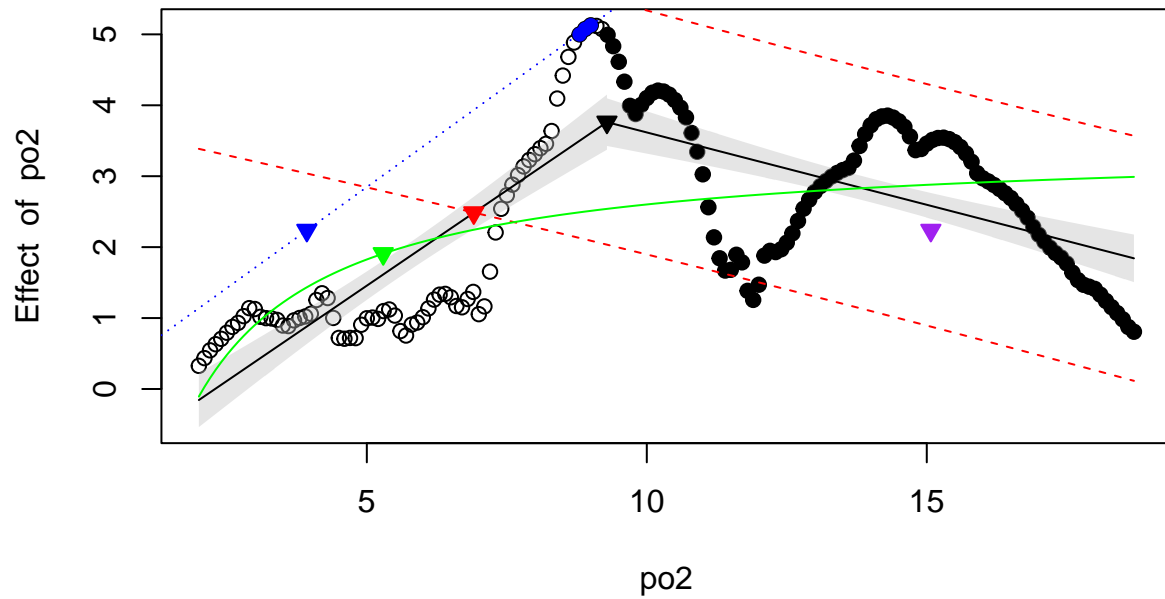
Sub-PI = 2.11



gr2muus1000-2 pcrit 7-26-21.txt

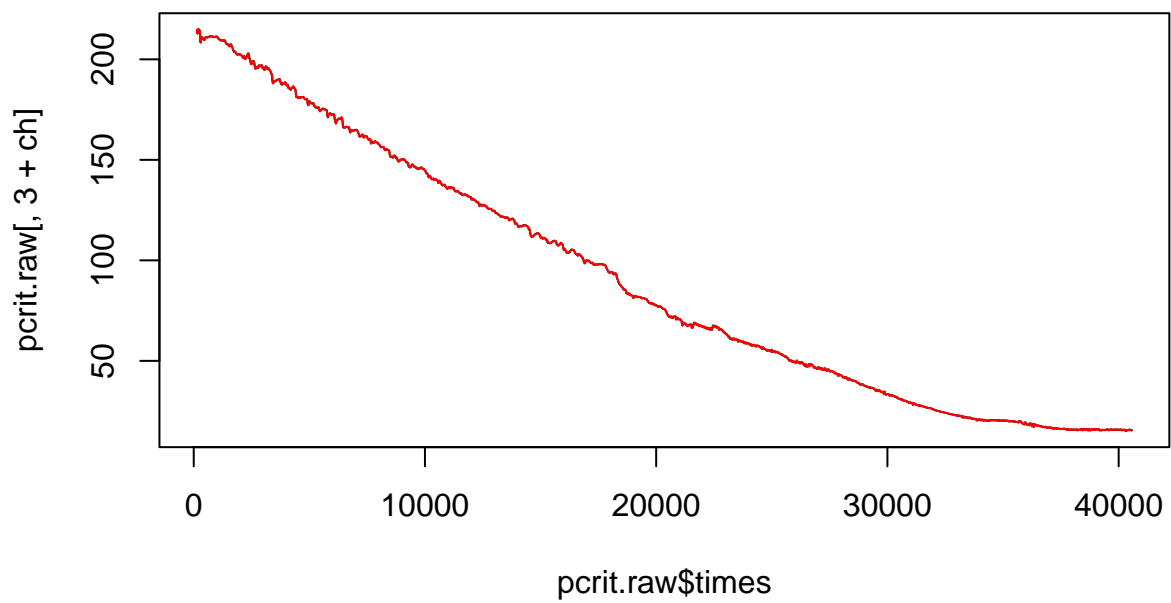


Alpha @ MR of 2.24 = 3.929
 Breakpoint = 9.288
 LLO @ MR of 2.24 = 15.073
 NLR (Hyperbola) = 5.293
 Sub-PI = 6.91



"MR" must be defined for LLO calculation.

GR2MUUS18007dayPcrit-7-20-21.txt



"MR" must be defined for LLO calculation.

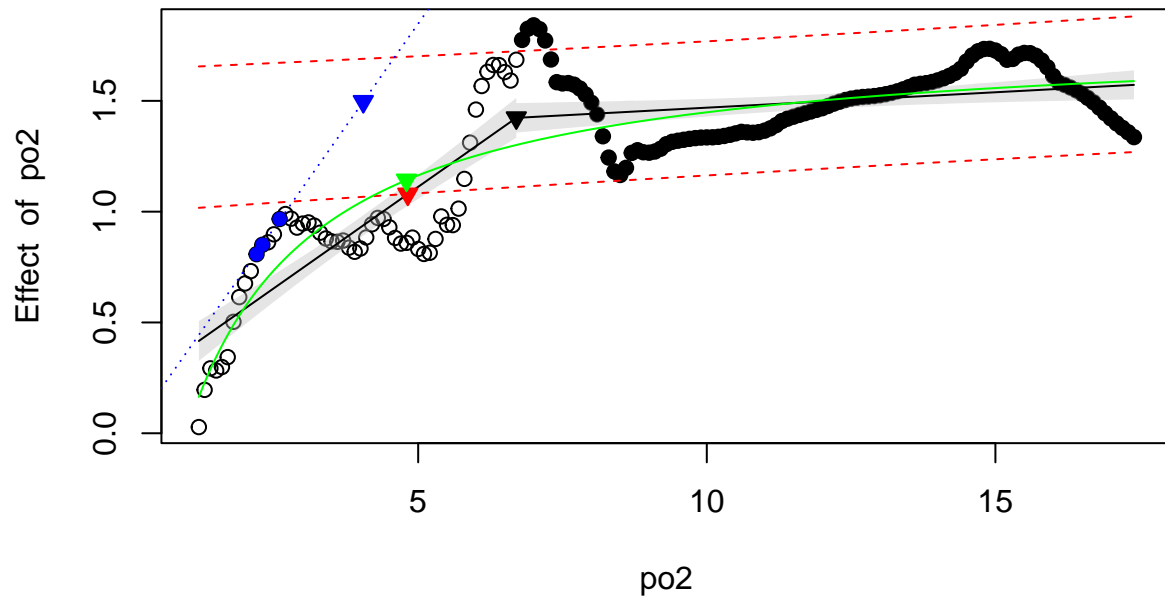
Alpha @ MR of 1.5 = 4.05

Breakpoint = 6.7

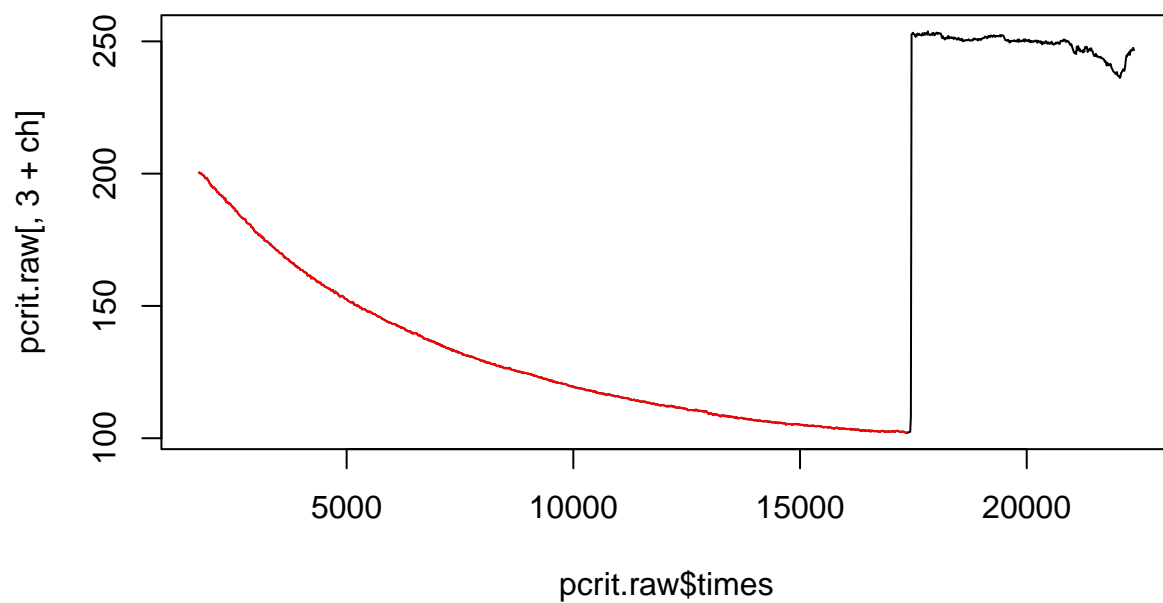
LLO @ MR of NA = NA

NLR (Hyperbola) = 4.797

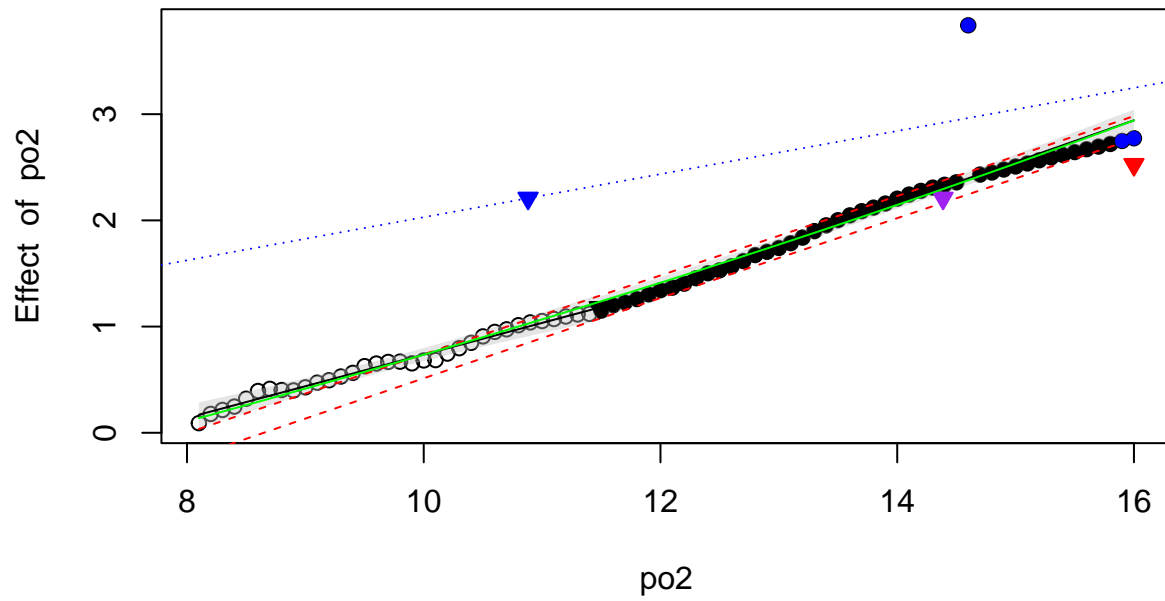
Sub-PI = 4.82



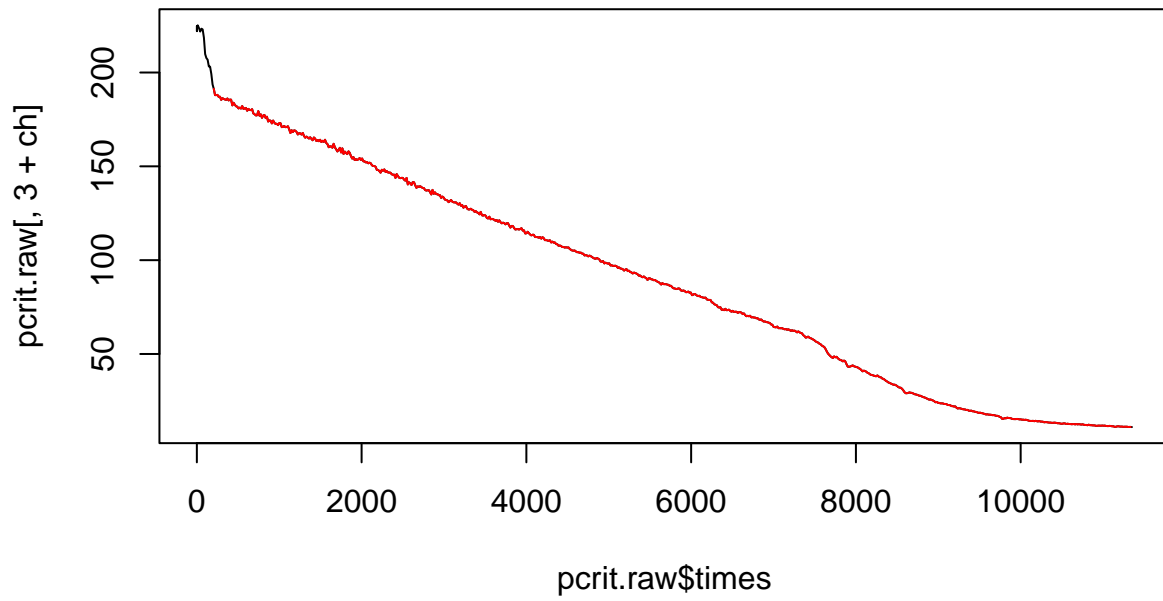
gr2MUUS1800-2pcritday7.8-3-21.txt



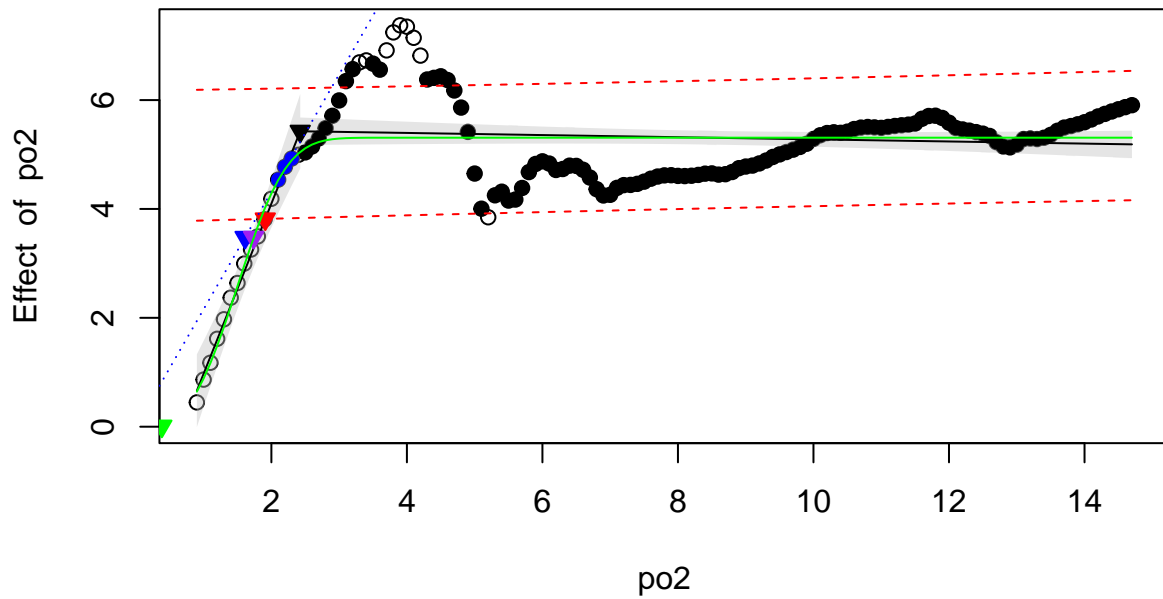
Alpha @ MR of 2.21 = 10.881
Breakpoint = 11.483
LLO @ MR of 2.21 = 14.387
NLR (Hyperbola) = 136.124
Sub-PI = 16



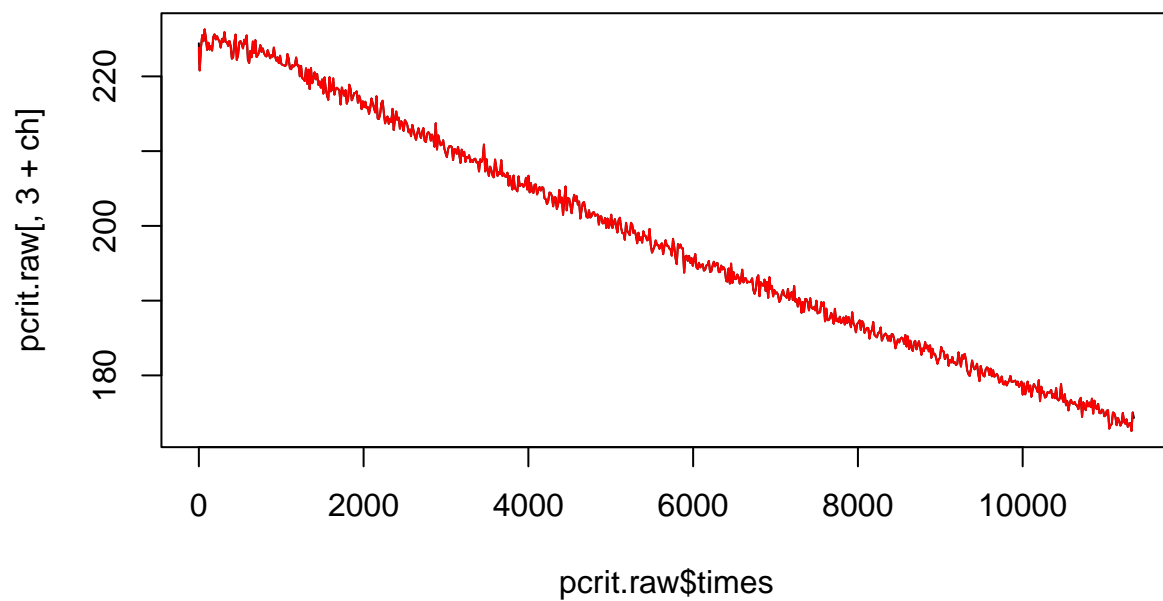
tbocto 1800 pcrit day 7 tank 10 blank ch 3 4 8-20-21-ch1.txt



Alpha @ MR of 3.48 = 1.612
Breakpoint = 2.426
LLO @ MR of 3.48 = 1.737
NLR (Weibull with intercept) = 0.384
Sub-PI = 1.91



tbocto 1800 pcrit day 7 tank 10 blank ch 3 4 8-20-21-ch1.txt



Could not calculate a Pcrit. Plotting just the values...

