#Data_entry.R: run this file to load the data for plotting with the plotting R script.

#Clears workspace rm(list=ls())

```
Dair<-6.02e-6
Dwater<-7.84e-10
```

Total capture areas determined by summing circumferences of all hairs for each model.

```
hermit.d <-1 #NOTE: These are set to 1 because we are using effective capture area instead of to
tal area. This calculation takes place in the calculate_plot.R file.
marine.d <-1
```

Loads Set 1 Data

#Sets working directory for Set 1 #setwd(paste(location,"/set1",sep=""))

Values of Cinf for each case.

```
cinf1.marinewater<-0.052328952493219   #Blue crab in water
cinf1.marineair<-0.038140257522164    #Blue crab in air
cinf1.hermitair<- 0.529629241195228  #Terrestrial crab in air
cinf1.hermitwater<-0.513774451365372      #Terrestrial crab in water
```

Loads data, Blue crab in water, Condition 1

```
marinewater11.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-ma
in/practical/set1/pertimestep_3300_marinewater.csv",header=FALSE)
summary(marinewater11.perstepdata)
```

```
##        V1               V2
##  Min.   :0.00000   Min.   :-1.000e-10
##  1st Qu.:0.01137   1st Qu.: 5.565e-04
##  Median :0.02274   Median : 6.810e-04
##  Mean   :0.03715   Mean   : 5.934e-04
##  3rd Qu.:0.03410   3rd Qu.: 6.950e-04
##  Max.   :0.28017   Max.   : 7.844e-04
```

```
marinewater11.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/pr
actical/set1/totalhairs_3300_marinewater.csv",header=FALSE)
summary(marinewater11.totals)
```

```
##       V1               V2               V3               V4
## Min.   :0.05389   Min.   :0.3135   Min.   :0.002664   Min.   :0.4618
## 1st Qu.:0.29826   1st Qu.:0.7000   1st Qu.:0.304150   1st Qu.:0.7536
## Median :0.50732   Median :0.9569   Median :0.529720   Median :0.9628
## Mean   :0.55127   Mean   :0.9734   Mean   :0.551272   Mean   :0.9734
## 3rd Qu.:0.79556   3rd Qu.:1.2237   3rd Qu.:0.801100   3rd Qu.:1.1672
## Max.   :1.14530   Max.   :1.7831   Max.   :1.081000   Max.   :1.5910
##       V5
## Min.   :0.000e+00
## 1st Qu.:0.000e+00
## Median :0.000e+00
## Mean   :3.826e-06
## 3rd Qu.:7.152e-06
## Max.   :2.600e-05
```

Loads data, Blue crab in water PIV with air D coefficient, Condition 1

```
marinewaterdair1.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu
-main/practical/set1/pertimestep_3315_marinewaterDswap.csv",header=FALSE)
summary(marinewaterdair1.perstepdata)
```

```
##       V1             V2
## Min.   :0.00   Min.   :0.000000
## 1st Qu.:0.07   1st Qu.:0.002218
## Median :0.14   Median :0.002220
## Mean   :0.14   Mean   :0.002196
## 3rd Qu.:0.21   3rd Qu.:0.002221
## Max.   :0.28   Max.   :0.002222
```

```
marinewaterdair1.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set1/totalhairs_3315_marinewaterDswap.csv",header=FALSE)
summary(marinewaterdair1.totals)
```

```
##       V1               V2               V3               V4
## Min.   :0.05389   Min.   :0.3135   Min.   :0.002664   Min.   :0.4618
## 1st Qu.:0.29826   1st Qu.:0.7000   1st Qu.:0.304150   1st Qu.:0.7536
## Median :0.50732   Median :0.9569   Median :0.529720   Median :0.9628
## Mean   :0.55127   Mean   :0.9734   Mean   :0.551272   Mean   :0.9734
## 3rd Qu.:0.79556   3rd Qu.:1.2237   3rd Qu.:0.801100   3rd Qu.:1.1672
## Max.   :1.14530   Max.   :1.7831   Max.   :1.081000   Max.   :1.5910
##       V5
## Min.   :5.600e-10
## 1st Qu.:3.763e-08
## Median :4.261e-07
## Mean   :1.084e-05
## 3rd Qu.:5.106e-06
## Max.   :1.782e-04
```

Loads data, Blue crab in air, Condition 1

```
marineair11.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set1/pertimestep_3306_marineair.csv",header=FALSE)
summary(marineair11.perstepdata)
```

```
##        V1              V2
##  Min.   :0.00   Min.   :0.000000
##  1st Qu.:0.07   1st Qu.:0.001358
##  Median :0.14   Median :0.001358
##  Mean   :0.14   Mean   :0.001339
##  3rd Qu.:0.21   3rd Qu.:0.001359
##  Max.   :0.28   Max.   :0.001359
```

```
marineair11.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/prac
tical/set1/totalhairs_3306_marineair.csv",header=FALSE)
summary(marineair11.totals)
```

```
##        V1               V2               V3               V4
##  Min.   :0.1986   Min.   :0.7148   Min.   :0.2003   Min.   :0.7163
##  1st Qu.:0.5007   1st Qu.:1.0082   1st Qu.:0.5015   1st Qu.:1.0076
##  Median :0.7268   Median :1.2162   Median :0.7268   Median :1.2169
##  Mean   :0.7484   Mean   :1.2275   Mean   :0.7484   Mean   :1.2275
##  3rd Qu.:0.9987   3rd Qu.:1.4204   3rd Qu.:0.9979   3rd Qu.:1.4213
##  Max.   :1.2792   Max.   :1.8444   Max.   :1.2776   Max.   :1.8449
##        V5
##  Min.   :1.710e-09
##  1st Qu.:1.087e-07
##  Median :8.796e-07
##  Mean   :6.631e-06
##  3rd Qu.:5.253e-06
##  Max.   :9.146e-05
```

Loads data, Blue crab in air PIV with water D coefficient

```
marineairdwater1.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu
-main/practical/set1/pertimestep_3312_marineairDswap.csv",header=FALSE)
summary(marineairdwater1.perstepdata)
```

```
##         V1               V2
##  Min.   :0.00000   Min.   :-6.400e-10
##  1st Qu.:0.01154   1st Qu.: 1.740e-04
##  Median :0.02308   Median : 2.401e-04
##  Mean   :0.03913   Mean   : 2.005e-04
##  3rd Qu.:0.03462   3rd Qu.: 2.545e-04
##  Max.   :0.27970   Max.   : 2.708e-04
```

```
marineairdwater1.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set1/totalhairs_3312_marineairDswap.csv",header=FALSE)
summary(marineairdwater1.totals)
```

```
##         V1               V2                V3               V4
##  Min.   :0.1986   Min.   :0.7148   Min.   :0.2003   Min.   :0.7163
##  1st Qu.:0.5007   1st Qu.:1.0082   1st Qu.:0.5015   1st Qu.:1.0076
##  Median :0.7268   Median :1.2162   Median :0.7268   Median :1.2169
##  Mean   :0.7484   Mean   :1.2275   Mean   :0.7484   Mean   :1.2275
##  3rd Qu.:0.9987   3rd Qu.:1.4204   3rd Qu.:0.9979   3rd Qu.:1.4213
##  Max.   :1.2792   Max.   :1.8444   Max.   :1.2776   Max.   :1.8449
##         V5
##  Min.   :-9.727e-08
##  1st Qu.: 0.000e+00
##  Median : 0.000e+00
##  Mean   : 1.321e-06
##  3rd Qu.: 0.000e+00
##  Max.   : 3.397e-05
```

Loads data, Blue crab in water, Condition 2

```
marinewater21.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-ma
in/practical/set1/pertimestep_3303_marinewater.csv",header=FALSE)
summary(marinewater21.perstepdata)
```

```
##         V1               V2
##  Min.   :0.00000   Min.   :0.00000
##  1st Qu.:0.01137   1st Qu.:0.01120
##  Median :0.02274   Median :0.02024
##  Mean   :0.03715   Mean   :0.01622
##  3rd Qu.:0.03410   3rd Qu.:0.02112
##  Max.   :0.28017   Max.   :0.02475
```

```
marinewater21.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/pr
actical/set1/totalhairs_3303_marinewater.csv",header=FALSE)
summary(marinewater21.totals)
```

```
##        V1               V2               V3               V4
## Min.    :0.05389   Min.    :0.3135   Min.    :0.002664   Min.    :0.4618
## 1st Qu.:0.29826   1st Qu.:0.7000   1st Qu.:0.304150   1st Qu.:0.7536
## Median :0.50732   Median :0.9569   Median :0.529720   Median :0.9628
## Mean    :0.55127   Mean    :0.9734   Mean    :0.551272   Mean    :0.9734
## 3rd Qu.:0.79556   3rd Qu.:1.2237   3rd Qu.:0.801100   3rd Qu.:1.1672
## Max.    :1.14530   Max.    :1.7831   Max.    :1.081000   Max.    :1.5910
##        V5
## Min.    :0.000e+00
## 1st Qu.:0.000e+00
## Median :0.000e+00
## Mean    :1.207e-04
## 3rd Qu.:8.956e-05
## Max.    :1.542e-03
```

Loads data, Blue crab in water long duration, condition 2

```
marinewaterTswap1.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimoz
u-main/practical/set1/pertimestep_3321_marinewaterTswap.csv",header=FALSE)
summary(marinewaterTswap1.perstepdata)
```

```
##        V1               V2
## Min.    :0.00000   Min.    :0.00000
## 1st Qu.:0.03463   1st Qu.:0.06983
## Median :0.06926   Median :0.17524
## Mean    :0.06926   Mean    :0.14144
## 3rd Qu.:0.10389   3rd Qu.:0.21094
## Max.    :0.13850   Max.    :0.21541
```

```
marinewaterTswap1.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set1/totalhairs_3321_marinewaterTswap.csv",header=FALSE)
summary(marinewaterTswap1.totals)
```

```
##        V1               V2               V3               V4
## Min.    :0.05389   Min.    :0.3135   Min.    :0.002664   Min.    :0.4618
## 1st Qu.:0.29826   1st Qu.:0.7000   1st Qu.:0.304150   1st Qu.:0.7536
## Median :0.50732   Median :0.9569   Median :0.529720   Median :0.9628
## Mean    :0.55127   Mean    :0.9734   Mean    :0.551272   Mean    :0.9734
## 3rd Qu.:0.79556   3rd Qu.:1.2237   3rd Qu.:0.801100   3rd Qu.:1.1672
## Max.    :1.14530   Max.    :1.7831   Max.    :1.081000   Max.    :1.5910
##        V5
## Min.    :-6.600e-07
## 1st Qu.: 0.000e+00
## Median : 3.020e-04
## Mean    : 1.051e-03
## 3rd Qu.: 1.631e-03
## Max.    : 9.147e-03
```

Loads data, Blue crab in air, Condition 2

```
marineair21.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set1/pertimestep_3309_marineair.csv",header=FALSE)
summary(marineair21.perstepdata)
```

```
##        V1              V2
##  Min.   :0.00   Min.   :0.0000
##  1st Qu.:0.07   1st Qu.:0.1032
##  Median :0.14   Median :0.1049
##  Mean   :0.14   Mean   :0.1004
##  3rd Qu.:0.21   3rd Qu.:0.1064
##  Max.   :0.28   Max.   :0.1077
```

```
marineair21.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/prac
tical/set1/totalhairs_3309_marineair.csv",header=FALSE)
summary(marineair21.totals)
```

```
##        V1              V2              V3              V4
##  Min.   :0.1986   Min.   :0.7148   Min.   :0.2003   Min.   :0.7163
##  1st Qu.:0.5007   1st Qu.:1.0082   1st Qu.:0.5015   1st Qu.:1.0076
##  Median :0.7268   Median :1.2162   Median :0.7268   Median :1.2169
##  Mean   :0.7484   Mean   :1.2275   Mean   :0.7484   Mean   :1.2275
##  3rd Qu.:0.9987   3rd Qu.:1.4204   3rd Qu.:0.9979   3rd Qu.:1.4213
##  Max.   :1.2792   Max.   :1.8444   Max.   :1.2776   Max.   :1.8449
##        V5
##  Min.   :1.050e-07
##  1st Qu.:6.461e-06
##  Median :6.378e-05
##  Mean   :5.252e-04
##  3rd Qu.:3.976e-04
##  Max.   :6.244e-03
```

Loads data, Blue crab in air long duration, condition 2

```
marineairTswap1.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-
main/practical/set1/pertimestep_3318_marineairTswap.csv",header=FALSE)
summary(marineairTswap1.perstepdata)
```

```
##           V1                V2
##  Min.    :0.00000   Min.    :0.0000
##  1st Qu.:0.03465    1st Qu.:0.2071
##  Median :0.06929    Median :0.4457
##  Mean    :0.06929   Mean    :0.3679
##  3rd Qu.:0.10394    3rd Qu.:0.5365
##  Max.    :0.13850   Max.    :0.5368
```

```
marineairTswap1.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/
practical/set1/totalhairs_3318_marineairTswap.csv",header=FALSE)
summary(marineairTswap1.totals)
```

```
##           V1                V2                V3                V4
##  Min.    :0.1986   Min.    :0.7148   Min.    :0.2003   Min.    :0.7163
##  1st Qu.:0.5007    1st Qu.:1.0082    1st Qu.:0.5015    1st Qu.:1.0076
##  Median :0.7268    Median :1.2162    Median :0.7268    Median :1.2169
##  Mean    :0.7484   Mean    :1.2275   Mean    :0.7484   Mean    :1.2275
##  3rd Qu.:0.9987    3rd Qu.:1.4204    3rd Qu.:0.9979    3rd Qu.:1.4213
##  Max.    :1.2792   Max.    :1.8444   Max.    :1.2776   Max.    :1.8449
##           V5
##  Min.    :7.730e-07
##  1st Qu.:4.715e-05
##  Median :3.882e-04
##  Mean    :2.619e-03
##  3rd Qu.:2.476e-03
##  Max.    :2.933e-02
```

Creates C/Cinf for per time step data, Condition 1

```
marinewater11.perstepdata$C<-marinewater11.perstepdata$V2/cinf1.marinewater
marineair11.perstepdata$C<-marineair11.perstepdata$V2/cinf1.marineair
marinewaterdair1.perstepdata$C<-marinewaterdair1.perstepdata$V2/cinf1.marineair
marineairdwater1.perstepdata$C<-marineairdwater1.perstepdata$V2/cinf1.marinewater
```

Adjusts for capture distance.

```
marinewater11.perstepdata$Cadj<-marinewater11.perstepdata$C/marine.d
marineair11.perstepdata$Cadj<-marineair11.perstepdata$C/marine.d
marinewaterdair1.perstepdata$Cadj<-marinewaterdair1.perstepdata$C/marine.d
marineairdwater1.perstepdata$Cadj<-marineairdwater1.perstepdata$C/marine.d
```

Creates C/Cinf for per hair data, Condition 1

```
marinewater11.totals$V5<-marinewater11.totals$V5/cinf1.marinewater
marinewater11.totals$V5<-marinewater11.totals$V5/marine.d   #Uncomment for standardizing per hair
data by capture area
marineair11.totals$V5<-marineair11.totals$V5/cinf1.marineair
marineair11.totals$V5<-marineair11.totals$V5/marine.d     #Uncomment for standardizing per hair
data by capture area
marinewaterdair1.totals$V5<-marinewaterdair1.totals$V5/cinf1.marineair
marinewaterdair1.totals$V5<-marinewaterdair1.totals$V5/marine.d   #Uncomment for standardizing pe
r hair data by capture area
marineairdwater1.totals$V5<-marineairdwater1.totals$V5/cinf1.marinewater
marineairdwater1.totals$V5<-marineairdwater1.totals$V5/marine.d     #Uncomment for standardizin
g per hair data by capture area
```

Creates C/Cinf for per time step data, Condition 2

```
marinewater21.perstepdata$C<-marinewater21.perstepdata$V2/cinf1.marinewater
marineair21.perstepdata$C<-marineair21.perstepdata$V2/cinf1.marineair
```

Adjusts for capture distance.

```
marinewater21.perstepdata$Cadj<-marinewater21.perstepdata$C/marine.d
marineair21.perstepdata$Cadj<-marineair21.perstepdata$C/marine.d
marinewaterTswap1.perstepdata$C<-marinewaterTswap1.perstepdata$V2/cinf1.marinewater
marineairTswap1.perstepdata$C<-marineairTswap1.perstepdata$V2/cinf1.marineair
marinewaterTswap1.perstepdata$Cadj<-marinewaterTswap1.perstepdata$C/marine.d
marineairTswap1.perstepdata$Cadj<-marineairTswap1.perstepdata$C/marine.d
```

Creates C/Cinf for per hair data, Condition 2

```
marinewater21.totals$V5<-marinewater21.totals$V5/cinf1.marinewater
marinewater21.totals$V5<-marinewater21.totals$V5/marine.d   #Uncomment for standardizing per hair
data by capture area
marinewaterTswap1.totals$V5<-marinewaterTswap1.totals$V5/cinf1.marinewater
marinewaterTswap1.totals$V5<-marinewaterTswap1.totals$V5/marine.d   #Uncomment for standardizing
 per hair data by capture area
marineair21.totals$V5<-marineair21.totals$V5/cinf1.marineair
marineair21.totals$V5<-marineair21.totals$V5/marine.d      #Uncomment for standardizing per hair
data by capture area
marineairTswap1.totals$V5<-marineairTswap1.totals$V5/cinf1.marineair
marineairTswap1.totals$V5<-marineairTswap1.totals$V5/marine.d       #Uncomment for standardizing
 per hair data by capture area
```

Loads data, Terrestrial crab in water, Condition 1

```
hermitwater11.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-ma
in/practical/set1/pertimestep_3161_hermitwater.csv",header=FALSE)
summary(hermitwater11.perstepdata)
```

```
##       V1                V2
##  Min.   :0.00000   Min.   :0.000e+00
##  1st Qu.:0.03464   1st Qu.:3.729e-06
##  Median :0.06928   Median :7.029e-05
##  Mean   :0.06928   Mean   :8.994e-05
##  3rd Qu.:0.10392   3rd Qu.:1.714e-04
##  Max.   :0.13850   Max.   :2.360e-04
```

```
hermitwater11.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/pr
actical/set1/totalhairs_3161_hermitwater.csv",header=FALSE)
summary(hermitwater11.totals)
```

```
##       V1                V2                V3
##  Min.   :0.05396   Min.   :0.03791   Min.   :5.219e-08
##  1st Qu.:0.06106   1st Qu.:0.07165   1st Qu.:1.527e-06
##  Median :0.06443   Median :0.10267   Median :6.335e-06
##  Mean   :0.06401   Mean   :0.10254   Mean   :1.966e-05
##  3rd Qu.:0.06738   3rd Qu.:0.13162   3rd Qu.:4.047e-05
##  Max.   :0.07500   Max.   :0.17388   Max.   :6.351e-05
```

Loads data, Terrestrial crab in water PIV with air D coefficient

```
hermitwaterdair1.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu
-main/practical/set1/pertimestep_3163_hermitwaterDswap.csv",header=FALSE)
summary(hermitwaterdair1.perstepdata)
```

```
##       V1                V2
##  Min.   :0.00000   Min.   :0.000000
##  1st Qu.:0.03466   1st Qu.:0.003298
##  Median :0.06931   Median :0.003298
##  Mean   :0.06931   Mean   :0.003263
##  3rd Qu.:0.10397   3rd Qu.:0.003298
##  Max.   :0.13850   Max.   :0.003298
```

```
hermitwaterdair1.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set1/totalhairs_3163_hermitwaterDswap.csv",header=FALSE)
summary(hermitwaterdair1.totals)
```

```
##        V1              V2              V3
##  Min.   :0.05396   Min.   :0.03791   Min.   :1.464e-05
##  1st Qu.:0.06106   1st Qu.:0.07165   1st Qu.:1.409e-04
##  Median :0.06443   Median :0.10267   Median :2.688e-04
##  Mean   :0.06401   Mean   :0.10254   Mean   :2.748e-04
##  3rd Qu.:0.06738   3rd Qu.:0.13162   3rd Qu.:3.683e-04
##  Max.   :0.07500   Max.   :0.17388   Max.   :6.535e-04
```

Loads data, Terrestrial crab in air

```
hermitair11.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set1/pertimestep_3116_hermitair.csv",header=FALSE)
summary(hermitair11.perstepdata)
```

```
##        V1               V2
##  Min.   :0.00000   Min.   :0.000000
##  1st Qu.:0.03466   1st Qu.:0.003315
##  Median :0.06931   Median :0.003315
##  Mean   :0.06931   Mean   :0.003279
##  3rd Qu.:0.10397   3rd Qu.:0.003315
##  Max.   :0.13850   Max.   :0.003315
```

```
hermitair11.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/prac
tical/set1/totalhairs_3116_hermitair.csv",header=FALSE)
summary(hermitair11.totals)
```

```
##        V1              V2              V3
##  Min.   :0.03843   Min.   :0.04070   Min.   :1.192e-05
##  1st Qu.:0.04554   1st Qu.:0.07444   1st Qu.:1.493e-04
##  Median :0.04891   Median :0.10546   Median :2.336e-04
##  Mean   :0.04848   Mean   :0.10533   Mean   :2.762e-04
##  3rd Qu.:0.05186   3rd Qu.:0.13442   3rd Qu.:3.834e-04
##  Max.   :0.05947   Max.   :0.17667   Max.   :6.783e-04
```

Loads data, Terrestrial crab in air PIV with water D coefficient

```
hermitairdwater1.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu
-main/practical/set1/pertimestep_3118_hermitairDswap.csv",header=FALSE)
summary(hermitairdwater1.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.000e+00
##  1st Qu.:0.03464   1st Qu.:3.480e-07
##  Median :0.06928   Median :2.414e-06
##  Mean   :0.06928   Mean   :3.799e-04
##  3rd Qu.:0.10393   3rd Qu.:1.907e-05
##  Max.   :0.13850   Max.   :4.976e-03
```

```
hermitairdwater1.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set1/totalhairs_3118_hermitairDswap.csv",header=FALSE)
summary(hermitairdwater1.totals)
```

```
##        V1                V2                V3
##  Min.   :0.03843   Min.   :0.04070   Min.   :1.000e-09
##  1st Qu.:0.04554   1st Qu.:0.07444   1st Qu.:8.200e-08
##  Median :0.04891   Median :0.10546   Median :3.330e-07
##  Mean   :0.04848   Mean   :0.10533   Mean   :4.147e-04
##  3rd Qu.:0.05186   3rd Qu.:0.13442   3rd Qu.:3.282e-06
##  Max.   :0.05947   Max.   :0.17667   Max.   :4.686e-03
```

Loads data, Terrestrial crab in water, Condition 2

```
hermitwater21.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-ma
in/practical/set1/pertimestep_3162_hermitwater.csv",header=FALSE)
summary(hermitwater21.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.000e+00
##  1st Qu.:0.03464   1st Qu.:6.984e-06
##  Median :0.06928   Median :3.401e-04
##  Mean   :0.06928   Mean   :8.034e-04
##  3rd Qu.:0.10392   3rd Qu.:1.545e-03
##  Max.   :0.13850   Max.   :2.819e-03
```

```
hermitwater21.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/pr
actical/set1/totalhairs_3162_hermitwater.csv",header=FALSE)
summary(hermitwater21.totals)
```

```
##        V1                V2                V3
##  Min.   :0.05396   Min.   :0.03791   Min.   :8.491e-07
##  1st Qu.:0.06106   1st Qu.:0.07165   1st Qu.:1.322e-05
##  Median :0.06443   Median :0.10267   Median :6.152e-05
##  Mean   :0.06401   Mean   :0.10254   Mean   :2.349e-04
##  3rd Qu.:0.06738   3rd Qu.:0.13162   3rd Qu.:5.177e-04
##  Max.   :0.07500   Max.   :0.17388   Max.   :6.873e-04
```

Loads data, Terrestrial crab in water, short duration of marine crab

```
hermitwaterTswap1.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimoz
u-main/practical/set1/pertimestep_3164_hermitwaterTswap.csv",header=FALSE)
summary(hermitwaterTswap1.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.000e+00
##  1st Qu.:0.01401   1st Qu.:4.600e-09
##  Median :0.02802   Median :1.591e-06
##  Mean   :0.06017   Mean   :5.569e-05
##  3rd Qu.:0.07040   3rd Qu.:2.883e-05
##  Max.   :0.28012   Max.   :4.221e-04
```

```
hermitwaterTswap1.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set1/totalhairs_3164_hermitwaterTswap.csv",header=FALSE)
summary(hermitwaterTswap1.totals)
```

```
##        V1                V2                V3
##  Min.   :0.05396   Min.   :0.03791   Min.   :3.532e-07
##  1st Qu.:0.06106   1st Qu.:0.07165   1st Qu.:9.784e-06
##  Median :0.06443   Median :0.10267   Median :2.871e-05
##  Mean   :0.06401   Mean   :0.10254   Mean   :3.517e-05
##  3rd Qu.:0.06738   3rd Qu.:0.13162   3rd Qu.:3.762e-05
##  Max.   :0.07500   Max.   :0.17388   Max.   :1.254e-04
```

Loads data, Terrestrial crab in air, Condition 2

```
hermitair21.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set1/pertimestep_3117_hermitair.csv",header=FALSE)
summary(hermitair21.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.0000
##  1st Qu.:0.03466   1st Qu.:0.1593
##  Median :0.06931   Median :0.3185
##  Mean   :0.06931   Mean   :0.2603
##  3rd Qu.:0.10397   3rd Qu.:0.3649
##  Max.   :0.13850   Max.   :0.3649
```

```
hermitair21.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/prac
tical/set1/totalhairs_3117_Hermitair.csv",header=FALSE)
summary(hermitair21.totals)
```

```
##           V1                V2                V3
##  Min.   :0.03843   Min.   :0.04070   Min.   :0.001311
##  1st Qu.:0.04554   1st Qu.:0.07444   1st Qu.:0.016410
##  Median :0.04891   Median :0.10546   Median :0.025659
##  Mean   :0.04848   Mean   :0.10533   Mean   :0.030407
##  3rd Qu.:0.05186   3rd Qu.:0.13442   3rd Qu.:0.042124
##  Max.   :0.05947   Max.   :0.17667   Max.   :0.074533
```

Loads data, Terrestrial crab in water, short duration of marine crab

```
hermitairTswap1.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/practical/set1/pertimestep_3120_hermitairTswap.csv",header=FALSE)
summary(hermitairTswap1.perstepdata)
```

```
##           V1                V2
##  Min.   :0.00000   Min.   :0.00000
##  1st Qu.:0.07001   1st Qu.:0.07536
##  Median :0.14003   Median :0.07536
##  Mean   :0.14003   Mean   :0.07313
##  3rd Qu.:0.21003   3rd Qu.:0.07536
##  Max.   :0.28000   Max.   :0.07536
```

```
hermitairTswap1.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/practical/set1/totalhairs_3120_hermitairTswap.csv",header=FALSE)
summary(hermitairTswap1.totals)
```

```
##           V1                V2                V3
##  Min.   :0.03843   Min.   :0.04070   Min.   :0.0002703
##  1st Qu.:0.04554   1st Qu.:0.07444   1st Qu.:0.0033903
##  Median :0.04891   Median :0.10546   Median :0.0053017
##  Mean   :0.04848   Mean   :0.10533   Mean   :0.0062801
##  3rd Qu.:0.05186   3rd Qu.:0.13442   3rd Qu.:0.0087130
##  Max.   :0.05947   Max.   :0.17667   Max.   :0.0154430
```

Creates C/Cinf for per time step data, Condition 1

```
hermitwater11.perstepdata$C<-hermitwater11.perstepdata$V2/cinf1.hermitwater
hermitair11.perstepdata$C<-hermitair11.perstepdata$V2/cinf1.hermitair
hermitwaterdair1.perstepdata$C<-hermitwaterdair1.perstepdata$V2/cinf1.hermitair
hermitairdwater1.perstepdata$C<-hermitairdwater1.perstepdata$V2/cinf1.hermitwater
```

Adjusts for capture distance.

```
hermitwater11.perstepdata$Cadj<-hermitwater11.perstepdata$C/hermit.d
hermitair11.perstepdata$Cadj<-hermitair11.perstepdata$C/hermit.d
hermitwaterdair1.perstepdata$Cadj<-hermitwaterdair1.perstepdata$C/hermit.d
hermitairdwater1.perstepdata$Cadj<-hermitairdwater1.perstepdata$C/hermit.d
```

Creates C/Cinf for per hair data

```
hermitwater11.totals$V3<-hermitwater11.totals$V3/cinf1.hermitwater
hermitwater11.totals$V3<-hermitwater11.totals$V3/hermit.d   #Uncomment for standardizing per hair
data by capture area
hermitair11.totals$V3<-hermitair11.totals$V3/cinf1.hermitair
hermitair11.totals$V3<-hermitair11.totals$V3/hermit.d      #Uncomment for standardizing per hair
data by capture area
hermitairdwater1.totals$V3<-hermitairdwater1.totals$V3/cinf1.hermitwater
hermitairdwater1.totals$V3<-hermitairdwater1.totals$V3/hermit.d
hermitwaterdair1.totals$V3<-hermitwaterdair1.totals$V3/cinf1.hermitair
hermitwaterdair1.totals$V3<-hermitwaterdair1.totals$V3/hermit.d
```

Creates C/Cinf for per time step data, Condition 2

```
hermitwater21.perstepdata$C<-hermitwater21.perstepdata$V2/cinf1.hermitwater
hermitair21.perstepdata$C<-hermitair21.perstepdata$V2/cinf1.hermitair
hermitwaterTswap1.perstepdata$C<-hermitwaterTswap1.perstepdata$V2/cinf1.hermitwater
hermitairTswap1.perstepdata$C<-hermitairTswap1.perstepdata$V2/cinf1.hermitair
```

Adjusts for capture distance.

```
hermitwater21.perstepdata$Cadj<-hermitwater21.perstepdata$C/hermit.d
hermitair21.perstepdata$Cadj<-hermitair21.perstepdata$C/hermit.d
hermitwaterTswap1.perstepdata$Cadj<-hermitwaterTswap1.perstepdata$C/hermit.d
hermitairTswap1.perstepdata$Cadj<-hermitairTswap1.perstepdata$C/hermit.d
```

Creates C/Cinf for per hair data, Condition 2

```
hermitwater21.totals$V3<-hermitwater21.totals$V3/cinf1.hermitwater
hermitwater21.totals$V3<-hermitwater21.totals$V3/hermit.d  #Uncomment for standardizing per hair
data by capture area
hermitair21.totals$V3<-hermitair21.totals$V3/cinf1.hermitair
hermitair21.totals$V3<-hermitair21.totals$V3/hermit.d      #Uncomment for standardizing per hair
data by capture area
hermitwaterTswap1.totals$V3<-hermitwaterTswap1.totals$V3/cinf1.hermitwater
hermitwaterTswap1.totals$V3<-hermitwaterTswap1.totals$V3/hermit.d  #Uncomment for standardizing
 per hair data by capture area
hermitairTswap1.totals$V3<-hermitairTswap1.totals$V3/cinf1.hermitair
hermitairTswap1.totals$V3<-hermitairTswap1.totals$V3/hermit.d      #Uncomment for standardizing
 per hair data by capture area
```

Loads Set 2 Data

Values of Cinf for each case.

```
cinf2.marinewater<-0.052328952493219   #Blue crab in water
cinf2.marineair<-0.037996784146410     #Blue crab in air
cinf2.hermitair<- 0.512951477711897 #Terrestrial crab in air
cinf2.hermitwater<-0.512951477711897   #Terrestrial crab in water
```

Loads data, Blue crab in water, Condition 1

```
marinewater12.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-ma
in/practical/set2/pertimestep_3301_marinewater.csv",header=FALSE)
summary(marinewater12.perstepdata)
```

```
##        V1              V2
##  Min.   :0.00000   Min.   :0.0000000
##  1st Qu.:0.01137   1st Qu.:0.0006070
##  Median :0.02274   Median :0.0007084
##  Mean   :0.03715   Mean   :0.0006228
##  3rd Qu.:0.03410   3rd Qu.:0.0007205
##  Max.   :0.28017   Max.   :0.0008039
```

```
marinewater12.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/pr
actical/set2/totalhairs_3301_marinewater.csv",header=FALSE)
summary(marinewater12.totals)
```

```
##       V1               V2               V3               V4
##  Min.   :0.04502   Min.   :0.3485   Min.   :-0.0153   Min.   :0.4919
##  1st Qu.:0.28939   1st Qu.:0.7350   1st Qu.: 0.2907   1st Qu.:0.7899
##  Median :0.49844   Median :0.9919   Median : 0.5201   Median :0.9954
##  Mean   :0.54240   Mean   :1.0084   Mean   : 0.5424   Mean   :1.0084
##  3rd Qu.:0.78668   3rd Qu.:1.2587   3rd Qu.: 0.7967   3rd Qu.:1.2005
##  Max.   :1.13640   Max.   :1.8181   Max.   : 1.0827   Max.   :1.6266
##       V5
##  Min.   :-8.750e-09
##  1st Qu.: 0.000e+00
##  Median : 0.000e+00
##  Mean   : 3.921e-06
##  3rd Qu.: 5.788e-06
##  Max.   : 3.742e-05
```

Loads data, Blue crab in water PIV with air D coefficient, Condition 1

```
marinewaterdair2.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu
-main/practical/set2/pertimestep_3316_marinewaterDswap.csv",header=FALSE)
summary(marinewaterdair2.perstepdata)
```

```
##       V1             V2
##  Min.   :0.00   Min.   :0.000000
##  1st Qu.:0.07   1st Qu.:0.002220
##  Median :0.14   Median :0.002221
##  Mean   :0.14   Mean   :0.002198
##  3rd Qu.:0.21   3rd Qu.:0.002221
##  Max.   :0.28   Max.   :0.002222
```

```
marinewaterdair2.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set2/totalhairs_3316_marinewaterDswap.csv",header=FALSE)
summary(marinewaterdair2.totals)
```

```
##       V1               V2               V3               V4
##  Min.   :0.04502   Min.   :0.3485   Min.   :-0.0153   Min.   :0.4919
##  1st Qu.:0.28939   1st Qu.:0.7350   1st Qu.: 0.2907   1st Qu.:0.7899
##  Median :0.49844   Median :0.9919   Median : 0.5201   Median :0.9954
##  Mean   :0.54240   Mean   :1.0084   Mean   : 0.5424   Mean   :1.0084
##  3rd Qu.:0.78668   3rd Qu.:1.2587   3rd Qu.: 0.7967   3rd Qu.:1.2005
##  Max.   :1.13640   Max.   :1.8181   Max.   : 1.0827   Max.   :1.6266
##       V5
##  Min.   :5.700e-10
##  1st Qu.:2.552e-08
##  Median :3.616e-07
##  Mean   :1.084e-05
##  3rd Qu.:4.741e-06
##  Max.   :1.838e-04
```

Loads data, Blue crab in air, Condition 1

```
marineair12.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set2/pertimestep_3307_marineair.csv",header=FALSE)
summary(marineair12.perstepdata)
```

```
##       V1              V2
## Min.   :0.00   Min.   :0.000000
## 1st Qu.:0.07   1st Qu.:0.001341
## Median :0.14   Median :0.001341
## Mean   :0.14   Mean   :0.001326
## 3rd Qu.:0.21   3rd Qu.:0.001341
## Max.   :0.28   Max.   :0.001342
```

```
marineair12.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/prac
tical/set2/totalhairs_3307_marineair.csv",header=FALSE)
summary(marineair12.totals)
```

```
##       V1               V2               V3               V4
## Min.   :0.1652   Min.   :0.7964   Min.   :0.1535   Min.   :0.7919
## 1st Qu.:0.4697   1st Qu.:1.0945   1st Qu.:0.4644   1st Qu.:1.0943
## Median :0.6977   Median :1.3001   Median :0.6972   Median :1.2985
## Mean   :0.7197   Mean   :1.3132   Mean   :0.7197   Mean   :1.3132
## 3rd Qu.:0.9723   3rd Qu.:1.5052   3rd Qu.:0.9777   3rd Qu.:1.5049
## Max.   :1.2559   Max.   :1.9313   Max.   :1.2673   Max.   :1.9337
##       V5
## Min.   :1.280e-09
## 1st Qu.:8.751e-08
## Median :6.681e-07
## Mean   :6.544e-06
## 3rd Qu.:4.370e-06
## Max.   :9.061e-05
```

Loads data, Blue crab in air PIV with water D coefficient

```
marineairdwater2.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu
-main/practical/set2/pertimestep_3313_marineairDswap.csv",header=FALSE)
summary(marineairdwater2.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :-1.000e-10
##  1st Qu.:0.01155   1st Qu.: 3.106e-04
##  Median :0.02310   Median : 3.611e-04
##  Mean   :0.03941   Mean   : 3.137e-04
##  3rd Qu.:0.03465   3rd Qu.: 3.688e-04
##  Max.   :0.28170   Max.   : 3.862e-04
```

```
marineairdwater2.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set2/totalhairs_3313_marineairDswap.csv",header=FALSE)
summary(marineairdwater2.totals)
```

```
##        V1                V2                V3                V4
##  Min.   :0.1652   Min.   :0.7964   Min.   :0.1535   Min.   :0.7919
##  1st Qu.:0.4697   1st Qu.:1.0945   1st Qu.:0.4644   1st Qu.:1.0943
##  Median :0.6977   Median :1.3001   Median :0.6972   Median :1.2985
##  Mean   :0.7197   Mean   :1.3132   Mean   :0.7197   Mean   :1.3132
##  3rd Qu.:0.9723   3rd Qu.:1.5052   3rd Qu.:0.9777   3rd Qu.:1.5049
##  Max.   :1.2559   Max.   :1.9313   Max.   :1.2673   Max.   :1.9337
##        V5
##  Min.   :-4.447e-09
##  1st Qu.: 0.000e+00
##  Median : 0.000e+00
##  Mean   : 1.884e-06
##  3rd Qu.: 1.470e-10
##  Max.   : 2.925e-05
```

Loads data, Blue crab in water, Condition 2

```
marinewater22.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-ma
in/practical/set2/pertimestep_3304_marinewater.csv",header=FALSE)
summary(marinewater22.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.00000
##  1st Qu.:0.01137   1st Qu.:0.01301
##  Median :0.02274   Median :0.02313
##  Mean   :0.03715   Mean   :0.01863
##  3rd Qu.:0.03410   3rd Qu.:0.02428
##  Max.   :0.28017   Max.   :0.02832
```

```
marinewater22.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/pr
actical/set2/totalhairs_3304_marinewater.csv",header=FALSE)
summary(marinewater22.totals)
```

```
##        V1                 V2                 V3                 V4
##  Min.   :0.04502   Min.   :0.3485   Min.   :-0.0153   Min.   :0.4919
##  1st Qu.:0.28939   1st Qu.:0.7350   1st Qu.: 0.2907   1st Qu.:0.7899
##  Median :0.49844   Median :0.9919   Median : 0.5201   Median :0.9954
##  Mean   :0.54240   Mean   :1.0084   Mean   : 0.5424   Mean   :1.0084
##  3rd Qu.:0.78668   3rd Qu.:1.2587   3rd Qu.: 0.7967   3rd Qu.:1.2005
##  Max.   :1.13640   Max.   :1.8181   Max.   : 1.0827   Max.   :1.6266
##        V5
##  Min.   :0.0000000
##  1st Qu.:0.0000000
##  Median :0.0000000
##  Mean   :0.0001382
##  3rd Qu.:0.0000846
##  Max.   :0.0014829
```

Loads data, Blue crab in water long duration, condition 2

```
marinewaterTswap2.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimoz
u-main/practical/set2/pertimestep_3322_marinewaterTswap.csv",header=FALSE)
summary(marinewaterTswap2.perstepdata)
```

```
##        V1                 V2
##  Min.   :0.00000   Min.   :0.00000
##  1st Qu.:0.03463   1st Qu.:0.07765
##  Median :0.06926   Median :0.18945
##  Mean   :0.06926   Mean   :0.15298
##  3rd Qu.:0.10389   3rd Qu.:0.22666
##  Max.   :0.13850   Max.   :0.23228
```

```
marinewaterTswap2.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set2/totalhairs_3322_marinewaterTswap.csv",header=FALSE)
summary(marinewaterTswap2.totals)
```

```
##        V1                 V2                 V3                 V4
##  Min.   :0.04502   Min.   :0.3485   Min.   :-0.0153   Min.   :0.4919
##  1st Qu.:0.28939   1st Qu.:0.7350   1st Qu.: 0.2907   1st Qu.:0.7899
##  Median :0.49844   Median :0.9919   Median : 0.5201   Median :0.9954
##  Mean   :0.54240   Mean   :1.0084   Mean   : 0.5424   Mean   :1.0084
##  3rd Qu.:0.78668   3rd Qu.:1.2587   3rd Qu.: 0.7967   3rd Qu.:1.2005
##  Max.   :1.13640   Max.   :1.8181   Max.   : 1.0827   Max.   :1.6266
##        V5
##  Min.   :-2.900e-08
##  1st Qu.: 0.000e+00
##  Median : 2.321e-04
##  Mean   : 1.133e-03
##  3rd Qu.: 1.637e-03
##  Max.   : 8.576e-03
```

Loads data, Blue crab in air, Condition 2

```
marineair22.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set2/pertimestep_3310_marineair.csv",header=FALSE)
summary(marineair22.perstepdata)
```

```
##       V1             V2
## Min.   :0.00   Min.   :0.0000
## 1st Qu.:0.07   1st Qu.:0.1091
## Median :0.14   Median :0.1118
## Mean   :0.14   Mean   :0.1071
## 3rd Qu.:0.21   3rd Qu.:0.1141
## Max.   :0.28   Max.   :0.1159
```

```
marineair22.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/prac
tical/set2/totalhairs_3310_marineair.csv",header=FALSE)
summary(marineair22.totals)
```

```
##       V1               V2               V3               V4
## Min.   :0.1652   Min.   :0.7964   Min.   :0.1535   Min.   :0.7919
## 1st Qu.:0.4697   1st Qu.:1.0945   1st Qu.:0.4644   1st Qu.:1.0943
## Median :0.6977   Median :1.3001   Median :0.6972   Median :1.2985
## Mean   :0.7197   Mean   :1.3132   Mean   :0.7197   Mean   :1.3132
## 3rd Qu.:0.9723   3rd Qu.:1.5052   3rd Qu.:0.9777   3rd Qu.:1.5049
## Max.   :1.2559   Max.   :1.9313   Max.   :1.2673   Max.   :1.9337
##       V5
## Min.   :1.140e-07
## 1st Qu.:6.352e-06
## Median :4.994e-05
## Mean   :5.656e-04
## 3rd Qu.:3.831e-04
## Max.   :7.580e-03
```

Loads data, Blue crab in air long duration, condition 2

```
marineairTswap2.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-
main/practical/set2/pertimestep_3319_marineairTswap.csv",header=FALSE)
summary(marineairTswap2.perstepdata)
```

```
##         V1                 V2
##   Min.   :0.00000    Min.   :0.0000
##   1st Qu.:0.03465    1st Qu.:0.2073
##   Median :0.06929    Median :0.4315
##   Mean   :0.06929    Mean   :0.3571
##   3rd Qu.:0.10394    3rd Qu.:0.5153
##   Max.   :0.13850    Max.   :0.5159
```

```
marineairTswap2.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/
practical/set2/totalhairs_3319_marineairTswap.csv",header=FALSE)
summary(marineairTswap2.totals)
```

```
##         V1                 V2                 V3                 V4
##   Min.   :0.1652    Min.   :0.7964    Min.   :0.1535    Min.   :0.7919
##   1st Qu.:0.4697    1st Qu.:1.0945    1st Qu.:0.4644    1st Qu.:1.0943
##   Median :0.6977    Median :1.3001    Median :0.6972    Median :1.2985
##   Mean   :0.7197    Mean   :1.3132    Mean   :0.7197    Mean   :1.3132
##   3rd Qu.:0.9723    3rd Qu.:1.5052    3rd Qu.:0.9777    3rd Qu.:1.5049
##   Max.   :1.2559    Max.   :1.9313    Max.   :1.2673    Max.   :1.9337
##         V5
##   Min.   :5.600e-07
##   1st Qu.:3.314e-05
##   Median :2.840e-04
##   Mean   :2.517e-03
##   3rd Qu.:1.727e-03
##   Max.   :3.284e-02
```

Creates C/Cinf for per time step data, Condition 1

```
marinewater12.perstepdata$C<-marinewater12.perstepdata$V2/cinf2.marinewater
marineair12.perstepdata$C<-marineair12.perstepdata$V2/cinf2.marineair
marinewaterdair2.perstepdata$C<-marinewaterdair2.perstepdata$V2/cinf2.marineair
marineairdwater2.perstepdata$C<-marineairdwater2.perstepdata$V2/cinf2.marinewater
# Adjusts for capture distance.
marinewater12.perstepdata$Cadj<-marinewater12.perstepdata$C/marine.d
marineair12.perstepdata$Cadj<-marineair12.perstepdata$C/marine.d
marinewaterdair2.perstepdata$Cadj<-marinewaterdair2.perstepdata$C/marine.d
marineairdwater2.perstepdata$Cadj<-marineairdwater2.perstepdata$C/marine.d
```

Creates C/Cinf for per hair data, Condition 1

```
marinewater12.totals$V5<-marinewater12.totals$V5/cinf2.marinewater
marinewater12.totals$V5<-marinewater12.totals$V5/marine.d   #Uncomment for standardizing per hair
data by capture area
marineair12.totals$V5<-marineair12.totals$V5/cinf2.marineair
marineair12.totals$V5<-marineair12.totals$V5/marine.d      #Uncomment for standardizing per hair
data by capture area
marinewaterdair2.totals$V5<-marinewaterdair2.totals$V5/cinf2.marineair
marinewaterdair2.totals$V5<-marinewaterdair2.totals$V5/marine.d   #Uncomment for standardizing pe
r hair data by capture area
marineairdwater2.totals$V5<-marineairdwater2.totals$V5/cinf2.marinewater
marineairdwater2.totals$V5<-marineairdwater2.totals$V5/marine.d      #Uncomment for standardizin
g per hair data by capture area
```

Creates C/Cinf for per time step data, Condition 2

```
marinewater22.perstepdata$C<-marinewater22.perstepdata$V2/cinf2.marinewater
marineair22.perstepdata$C<-marineair22.perstepdata$V2/cinf2.marineair
```

Adjusts for capture distance.

```
marinewater22.perstepdata$Cadj<-marinewater22.perstepdata$C/marine.d
marineair22.perstepdata$Cadj<-marineair22.perstepdata$C/marine.d
marinewaterTswap2.perstepdata$C<-marinewaterTswap2.perstepdata$V2/cinf2.marinewater
marineairTswap2.perstepdata$C<-marineairTswap2.perstepdata$V2/cinf2.marineair
marinewaterTswap2.perstepdata$Cadj<-marinewaterTswap2.perstepdata$C/marine.d
marineairTswap2.perstepdata$Cadj<-marineairTswap2.perstepdata$C/marine.d
```

Creates C/Cinf for per hair data, Condition 2

```
marinewater22.totals$V5<-marinewater22.totals$V5/cinf2.marinewater
marinewater22.totals$V5<-marinewater22.totals$V5/marine.d   #Uncomment for standardizing per hair
data by capture area
marinewaterTswap2.totals$V5<-marinewaterTswap2.totals$V5/cinf2.marinewater
marinewaterTswap2.totals$V5<-marinewaterTswap2.totals$V5/marine.d   #Uncomment for standardizing
 per hair data by capture area
marineair22.totals$V5<-marineair22.totals$V5/cinf2.marineair
marineair22.totals$V5<-marineair22.totals$V5/marine.d      #Uncomment for standardizing per hair
data by capture area
marineairTswap2.totals$V5<-marineairTswap2.totals$V5/cinf2.marineair
marineairTswap2.totals$V5<-marineairTswap2.totals$V5/marine.d      #Uncomment for standardizing
 per hair data by capture area
```

Loads data, Terrestrial crab in water, Condition 1

```
hermitwater12.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-ma
in/practical/set2/pertimestep_3165_hermitwater.csv",header=FALSE)
summary(hermitwater12.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.000e+00
##  1st Qu.:0.03465   1st Qu.:1.778e-05
##  Median :0.06929   Median :1.634e-04
##  Mean   :0.06929   Mean   :1.518e-04
##  3rd Qu.:0.10394   3rd Qu.:2.683e-04
##  Max.   :0.13850   Max.   :3.141e-04
```

```
hermitwater12.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/pr
actical/set2/totalhairs_3165_hermitwater.csv",header=FALSE)
summary(hermitwater12.totals)
```

```
##        V1                V2                V3                V4
##  Min.   :0.05720   Min.   :0.04185   Min.   :0.05720   Min.   :0.04185
##  1st Qu.:0.06431   1st Qu.:0.07559   1st Qu.:0.06431   1st Qu.:0.07559
##  Median :0.06768   Median :0.10661   Median :0.06768   Median :0.10661
##  Mean   :0.06725   Mean   :0.10648   Mean   :0.06725   Mean   :0.10648
##  3rd Qu.:0.07063   3rd Qu.:0.13556   3rd Qu.:0.07063   3rd Qu.:0.13556
##  Max.   :0.07825   Max.   :0.17782   Max.   :0.07825   Max.   :0.17782
##        V5
##  Min.   :2.136e-07
##  1st Qu.:7.561e-06
##  Median :2.036e-05
##  Mean   :2.617e-05
##  3rd Qu.:2.821e-05
##  Max.   :1.150e-04
```

Loads data, Terrestrial crab in water PIV with air D coefficient

```
hermitwaterdair2.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu
-main/practical/set2/pertimestep_3170_hermitwaterDswap.csv",header=FALSE)
summary(hermitwaterdair2.perstepdata)
```

```
##         V1              V2
##  Min.   :0.00000   Min.   :0.000000
##  1st Qu.:0.03466   1st Qu.:0.003265
##  Median :0.06931   Median :0.003265
##  Mean   :0.06931   Mean   :0.003229
##  3rd Qu.:0.10397   3rd Qu.:0.003265
##  Max.   :0.13850   Max.   :0.003265
```

```
hermitwaterdair2.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set2/totalhairs_3170_hermitwaterDswap.csv",header=FALSE)
summary(hermitwaterdair2.totals)
```

```
##         V1              V2              V3
##  Min.   :0.05720   Min.   :0.04185   Min.   :1.512e-05
##  1st Qu.:0.06431   1st Qu.:0.07559   1st Qu.:1.440e-04
##  Median :0.06768   Median :0.10661   Median :2.573e-04
##  Mean   :0.06725   Mean   :0.10648   Mean   :2.720e-04
##  3rd Qu.:0.07063   3rd Qu.:0.13556   3rd Qu.:3.668e-04
##  Max.   :0.07825   Max.   :0.17782   Max.   :6.496e-04
```

Loads data, Terrestrial crab in air

```
hermitair12.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set2/pertimestep_3167_hermitair.csv",header=FALSE)
summary(hermitair12.perstepdata)
```

```
##         V1              V2
##  Min.   :0.00000   Min.   :0.000000
##  1st Qu.:0.03466   1st Qu.:0.003203
##  Median :0.06931   Median :0.003203
##  Mean   :0.06931   Mean   :0.003170
##  3rd Qu.:0.10397   3rd Qu.:0.003203
##  Max.   :0.13850   Max.   :0.003203
```

```
hermitair12.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/prac
tical/set2/totalhairs_3167_hermitair.csv",header=FALSE)
summary(hermitair12.totals)
```

```
##         V1              V2              V3
##  Min.   :0.05720   Min.   :0.04071   Min.   :1.486e-05
##  1st Qu.:0.06431   1st Qu.:0.07446   1st Qu.:1.388e-04
##  Median :0.06768   Median :0.10547   Median :2.607e-04
##  Mean   :0.06725   Mean   :0.10534   Mean   :2.669e-04
##  3rd Qu.:0.07063   3rd Qu.:0.13443   3rd Qu.:3.622e-04
##  Max.   :0.07825   Max.   :0.17668   Max.   :6.367e-04
```

Loads data, Terrestrial crab in air PIV with water D coefficient

```
hermitairdwater2.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu
-main/practical/set2/pertimestep_3169_hermitairDswap.csv",header=FALSE)
summary(hermitairdwater2.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.000e+00
##  1st Qu.:0.03464   1st Qu.:2.124e-05
##  Median :0.06929   Median :8.978e-05
##  Mean   :0.06929   Mean   :1.069e-04
##  3rd Qu.:0.10393   3rd Qu.:2.023e-04
##  Max.   :0.13850   Max.   :2.456e-04
```

```
hermitairdwater2.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set2/totalhairs_3169_hermitairDswap.csv",header=FALSE)
summary(hermitairdwater2.totals)
```

```
##        V1                V2                V3
##  Min.   :0.05720   Min.   :0.04071   Min.   :3.770e-09
##  1st Qu.:0.06431   1st Qu.:0.07446   1st Qu.:2.874e-07
##  Median :0.06768   Median :0.10547   Median :2.059e-06
##  Mean   :0.06725   Mean   :0.10534   Mean   :2.047e-05
##  3rd Qu.:0.07063   3rd Qu.:0.13443   3rd Qu.:4.922e-06
##  Max.   :0.07825   Max.   :0.17668   Max.   :1.158e-04
```

Loads data, Terrestrial crab in water, Condition 2

```
hermitwater22.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-ma
in/practical/set2/pertimestep_3166_hermitwater.csv",header=FALSE)
summary(hermitwater22.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.0000000
##  1st Qu.:0.03465   1st Qu.:0.0000324
##  Median :0.06929   Median :0.0011566
##  Mean   :0.06929   Mean   :0.0016908
##  3rd Qu.:0.10394   3rd Qu.:0.0032899
##  Max.   :0.13850   Max.   :0.0046762
```

```
hermitwater22.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/pr
actical/set2/totalhairs_3166_hermitwater.csv",header=FALSE)
summary(hermitwater22.totals)
```

```
##        V1              V2               V3
##  Min.   :0.05720   Min.   :0.04185   Min.   :3.253e-06
##  1st Qu.:0.06431   1st Qu.:0.07559   1st Qu.:8.549e-05
##  Median :0.06768   Median :0.10661   Median :2.508e-04
##  Mean   :0.06725   Mean   :0.10648   Mean   :3.897e-04
##  3rd Qu.:0.07063   3rd Qu.:0.13556   3rd Qu.:3.508e-04
##  Max.   :0.07825   Max.   :0.17782   Max.   :2.012e-03
```

Loads data, Terrestrial crab in water, short duration of marine crab

```
hermitwaterTswap2.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimoz
u-main/practical/set2/pertimestep_3172_hermitwaterTswap.csv",header=FALSE)
summary(hermitwaterTswap2.perstepdata)
```

```
##        V1              V2
##  Min.   :0.00000   Min.   :0.000e+00
##  1st Qu.:0.01401   1st Qu.:1.180e-08
##  Median :0.02802   Median :1.205e-06
##  Mean   :0.06014   Mean   :5.137e-05
##  3rd Qu.:0.07028   3rd Qu.:3.198e-05
##  Max.   :0.28002   Max.   :3.706e-04
```

```
hermitwaterTswap2.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set2/totalhairs_3172_hermitwaterTswap.csv",header=FALSE)
summary(hermitwaterTswap2.totals)
```

```
##        V1              V2               V3
##  Min.   :0.05720   Min.   :0.04185   Min.   :1.968e-07
##  1st Qu.:0.06431   1st Qu.:0.07559   1st Qu.:3.038e-06
##  Median :0.06768   Median :0.10661   Median :1.347e-05
##  Mean   :0.06725   Mean   :0.10648   Mean   :3.089e-05
##  3rd Qu.:0.07063   3rd Qu.:0.13556   3rd Qu.:2.587e-05
##  Max.   :0.07825   Max.   :0.17782   Max.   :1.892e-04
```

Loads data, Terrestrial crab in air, Condition 2

```
hermitair22.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set2/pertimestep_3168_hermitair.csv",header=FALSE)
summary(hermitair22.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.0000
##  1st Qu.:0.03466   1st Qu.:0.1607
##  Median :0.06931   Median :0.3214
##  Mean   :0.06931   Mean   :0.2629
##  3rd Qu.:0.10397   3rd Qu.:0.3688
##  Max.   :0.13850   Max.   :0.3688
```

```
hermitair22.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/prac
tical/set2/totalhairs_3168_hermitair.csv",header=FALSE)
summary(hermitair22.totals)
```

```
##        V1                V2                V3
##  Min.   :0.05720   Min.   :0.04071   Min.   :0.00171
##  1st Qu.:0.06431   1st Qu.:0.07446   1st Qu.:0.01597
##  Median :0.06768   Median :0.10547   Median :0.02996
##  Mean   :0.06725   Mean   :0.10534   Mean   :0.03074
##  3rd Qu.:0.07063   3rd Qu.:0.13443   3rd Qu.:0.04168
##  Max.   :0.07825   Max.   :0.17668   Max.   :0.07329
```

Loads data, Terrestrial crab in air, short duration of marine crab

```
hermitairTswap2.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-
main/practical/set2/pertimestep_3171_hermitairTswap.csv",header=FALSE)
summary(hermitairTswap2.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.00000
##  1st Qu.:0.07001   1st Qu.:0.07664
##  Median :0.14003   Median :0.07664
##  Mean   :0.14003   Mean   :0.07434
##  3rd Qu.:0.21003   3rd Qu.:0.07664
##  Max.   :0.28000   Max.   :0.07664
```

```
hermitairTswap2.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/
practical/set2/totalhairs_3171_hermitairTswap.csv",header=FALSE)
summary(hermitairTswap2.totals)
```

```
##        V1                V2                V3
##  Min.   :0.05720   Min.   :0.04071   Min.   :0.000354
##  1st Qu.:0.06431   1st Qu.:0.07446   1st Qu.:0.003320
##  Median :0.06768   Median :0.10547   Median :0.006216
##  Mean   :0.06725   Mean   :0.10534   Mean   :0.006386
##  3rd Qu.:0.07063   3rd Qu.:0.13443   3rd Qu.:0.008674
##  Max.   :0.07825   Max.   :0.17668   Max.   :0.015283
```

Creates C/Cinf for per time step data, Condition 1

```
hermitwater12.perstepdata$C<-hermitwater12.perstepdata$V2/cinf2.hermitwater
hermitair12.perstepdata$C<-hermitair12.perstepdata$V2/cinf2.hermitair
hermitwaterdair2.perstepdata$C<-hermitwaterdair2.perstepdata$V2/cinf2.hermitair
hermitairdwater2.perstepdata$C<-hermitairdwater2.perstepdata$V2/cinf2.hermitwater
```

Adjusts for capture distance.

```
hermitwater12.perstepdata$Cadj<-hermitwater12.perstepdata$C/hermit.d
hermitair12.perstepdata$Cadj<-hermitair12.perstepdata$C/hermit.d
hermitwaterdair2.perstepdata$Cadj<-hermitwaterdair2.perstepdata$C/hermit.d
hermitairdwater2.perstepdata$Cadj<-hermitairdwater2.perstepdata$C/hermit.d
```

Creates C/Cinf for per hair data

```
hermitwater12.totals$V3<-hermitwater12.totals$V3/cinf2.hermitwater
hermitwater12.totals$V3<-hermitwater12.totals$V3/hermit.d   #Uncomment for standardizing per hair
data by capture area
hermitair12.totals$V3<-hermitair12.totals$V3/cinf2.hermitair
hermitair12.totals$V3<-hermitair12.totals$V3/hermit.d      #Uncomment for standardizing per hair
data by capture area
hermitairdwater2.totals$V3<-hermitairdwater2.totals$V3/cinf2.hermitwater
hermitairdwater2.totals$V3<-hermitairdwater2.totals$V3/hermit.d
hermitwaterdair2.totals$V3<-hermitwaterdair2.totals$V3/cinf2.hermitair
hermitwaterdair2.totals$V3<-hermitwaterdair2.totals$V3/hermit.d
```

Creates C/Cinf for per time step data, Condition 2

```
hermitwater22.perstepdata$C<-hermitwater22.perstepdata$V2/cinf2.hermitwater
hermitair22.perstepdata$C<-hermitair22.perstepdata$V2/cinf2.hermitair
hermitwaterTswap2.perstepdata$C<-hermitwaterTswap2.perstepdata$V2/cinf2.hermitwater
hermitairTswap2.perstepdata$C<-hermitairTswap2.perstepdata$V2/cinf2.hermitair
```

Adjusts for capture distance.

```
hermitwater22.perstepdata$Cadj<-hermitwater22.perstepdata$C/hermit.d
hermitair22.perstepdata$Cadj<-hermitair22.perstepdata$C/hermit.d
hermitwaterTswap2.perstepdata$Cadj<-hermitwaterTswap2.perstepdata$C/hermit.d
hermitairTswap2.perstepdata$Cadj<-hermitairTswap2.perstepdata$C/hermit.d
```

Creates C/Cinf for per hair data, Condition 2

```
hermitwater22.totals$V3<-hermitwater22.totals$V3/cinf2.hermitwater
hermitwater22.totals$V3<-hermitwater22.totals$V3/hermit.d   #Uncomment for standardizing per hair
data by capture area
hermitair22.totals$V3<-hermitair22.totals$V3/cinf2.hermitair
hermitair22.totals$V3<-hermitair22.totals$V3/hermit.d      #Uncomment for standardizing per hair
data by capture area
hermitwaterTswap2.totals$V3<-hermitwaterTswap2.totals$V3/cinf2.hermitwater
hermitwaterTswap2.totals$V3<-hermitwaterTswap2.totals$V3/hermit.d   #Uncomment for standardizing
 per hair data by capture area
hermitairTswap2.totals$V3<-hermitairTswap2.totals$V3/cinf2.hermitair
hermitairTswap2.totals$V3<-hermitairTswap2.totals$V3/hermit.d       #Uncomment for standardizing
 per hair data by capture area
```

Loads Set 3 Data

Values of Cinf for each case.

```
cinf3.marinewater<-0.053844453778029   #Blue crab in water
cinf3.marineair<-0.037957737240439     #Blue crab in air
cinf3.hermitair<- 0.526007400705351   #Terrestrial crab in air
cinf3.hermitwater<- 0.537114520259193    #Terrestrial crab in water
```

Loads data, Blue crab in water, Condition 1

```
marinewater13.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-ma
in/practical/set3/pertimestep_3302_marinewater.csv",header=FALSE)
summary(marinewater13.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :-1.000e-10
##  1st Qu.:0.01137   1st Qu.: 5.203e-04
##  Median :0.02273   Median : 6.569e-04
##  Mean   :0.03712   Mean   : 5.668e-04
##  3rd Qu.:0.03410   3rd Qu.: 6.805e-04
##  Max.   :0.27989   Max.   : 7.673e-04
```

```
marinewater13.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/pr
actical/set3/totalhairs_3302_marinewater.csv",header=FALSE)
summary(marinewater13.totals)
```

```
##        V1                 V2                 V3                 V4
##  Min.   :0.01044   Min.   :0.2956   Min.   :0.01044   Min.   :0.2956
##  1st Qu.:0.25481   1st Qu.:0.6821   1st Qu.:0.25481   1st Qu.:0.6821
##  Median :0.46387   Median :0.9390   Median :0.46387   Median :0.9390
##  Mean   :0.50782   Mean   :0.9555   Mean   :0.50782   Mean   :0.9555
##  3rd Qu.:0.75210   3rd Qu.:1.2058   3rd Qu.:0.75210   3rd Qu.:1.2058
##  Max.   :1.10180   Max.   :1.7652   Max.   :1.10180   Max.   :1.7652
##        V5
##  Min.   :-1.288e-08
##  1st Qu.: 0.000e+00
##  Median : 0.000e+00
##  Mean   : 3.743e-06
##  3rd Qu.: 5.698e-06
##  Max.   : 2.939e-05
```

Loads data, Blue crab in water PIV with air D coefficient, Condition 1

```
marinewaterdair3.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu
-main/practical/set3/pertimestep_3317_marinewaterDswap.csv",header=FALSE)
summary(marinewaterdair3.perstepdata)
```

```
##        V1               V2
##  Min.   :0.00   Min.   :0.000000
##  1st Qu.:0.07   1st Qu.:0.002240
##  Median :0.14   Median :0.002240
##  Mean   :0.14   Mean   :0.002216
##  3rd Qu.:0.21   3rd Qu.:0.002241
##  Max.   :0.28   Max.   :0.002241
```

```
marinewaterdair3.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set3/totalhairs_3317_marinewaterDswap.csv",header=FALSE)
summary(marinewaterdair3.totals)
```

```
##        V1                 V2                 V3                 V4
##  Min.   :0.01044   Min.   :0.2956   Min.   :0.01044   Min.   :0.2956
##  1st Qu.:0.25481   1st Qu.:0.6821   1st Qu.:0.25481   1st Qu.:0.6821
##  Median :0.46387   Median :0.9390   Median :0.46387   Median :0.9390
##  Mean   :0.50782   Mean   :0.9555   Mean   :0.50782   Mean   :0.9555
##  3rd Qu.:0.75210   3rd Qu.:1.2058   3rd Qu.:0.75210   3rd Qu.:1.2058
##  Max.   :1.10180   Max.   :1.7652   Max.   :1.10180   Max.   :1.7652
##        V5
##  Min.   :5.100e-10
##  1st Qu.:2.421e-08
##  Median :3.667e-07
##  Mean   :1.093e-05
##  3rd Qu.:5.205e-06
##  Max.   :1.604e-04
```

Loads data, Blue crab in air, Condition 1

```
marineair13.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set3/pertimestep_3308_marineair.csv",header=FALSE)
summary(marineair13.perstepdata)
```

```
##        V1              V2
##  Min.   :0.00   Min.   :0.000000
##  1st Qu.:0.07   1st Qu.:0.001306
##  Median :0.14   Median :0.001306
##  Mean   :0.14   Mean   :0.001289
##  3rd Qu.:0.21   3rd Qu.:0.001307
##  Max.   :0.28   Max.   :0.001307
```

```
marineair13.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/prac
tical/set3/totalhairs_3308_marineair.csv",header=FALSE)
summary(marineair13.totals)
```

```
##        V1               V2               V3               V4
##  Min.   :0.2510   Min.   :0.7466   Min.   :0.2510   Min.   :0.7465
##  1st Qu.:0.5469   1st Qu.:1.0381   1st Qu.:0.5469   1st Qu.:1.0383
##  Median :0.7689   Median :1.2432   Median :0.7689   Median :1.2430
##  Mean   :0.7905   Mean   :1.2547   Mean   :0.7905   Mean   :1.2547
##  3rd Qu.:1.0366   3rd Qu.:1.4455   3rd Qu.:1.0366   3rd Qu.:1.4453
##  Max.   :1.3135   Max.   :1.8657   Max.   :1.3134   Max.   :1.8654
##        V5
##  Min.   :1.100e-09
##  1st Qu.:8.060e-08
##  Median :8.288e-07
##  Mean   :6.375e-06
##  3rd Qu.:4.234e-06
##  Max.   :9.048e-05
```

Loads data, Blue crab in air PIV with water D coefficient

```
marineairdwater3.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu
-main/practical/set3/pertimestep_3314_marineairDswap.csv",header=FALSE)
summary(marineairdwater3.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :-1.000e-10
##  1st Qu.:0.01155   1st Qu.: 2.470e-04
##  Median :0.02309   Median : 3.395e-04
##  Mean   :0.03908   Mean   : 3.039e-04
##  3rd Qu.:0.03464   3rd Qu.: 4.014e-04
##  Max.   :0.27926   Max.   : 4.420e-04
```

```
marineairdwater3.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set3/totalhairs_3314_marineairDswap.csv",header=FALSE)
summary(marineairdwater3.totals)
```

```
##        V1                V2                V3                V4
##  Min.   :0.2510   Min.   :0.7466   Min.   :0.2510   Min.   :0.7465
##  1st Qu.:0.5469   1st Qu.:1.0381   1st Qu.:0.5469   1st Qu.:1.0383
##  Median :0.7689   Median :1.2432   Median :0.7689   Median :1.2430
##  Mean   :0.7905   Mean   :1.2547   Mean   :0.7905   Mean   :1.2547
##  3rd Qu.:1.0366   3rd Qu.:1.4455   3rd Qu.:1.0366   3rd Qu.:1.4453
##  Max.   :1.3135   Max.   :1.8657   Max.   :1.3134   Max.   :1.8654
##        V5
##  Min.   :-9.352e-08
##  1st Qu.: 0.000e+00
##  Median : 0.000e+00
##  Mean   : 2.156e-06
##  3rd Qu.: 0.000e+00
##  Max.   : 5.275e-05
```

Loads data, Blue crab in water, Condition 2

```
marinewater23.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-ma
in/practical/set3/pertimestep_3305_marinewater.csv",header=FALSE)
summary(marinewater23.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.000000
##  1st Qu.:0.01137   1st Qu.:0.009055
##  Median :0.02273   Median :0.017743
##  Mean   :0.03712   Mean   :0.014089
##  3rd Qu.:0.03410   3rd Qu.:0.018739
##  Max.   :0.27989   Max.   :0.022230
```

```
marinewater23.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/pr
actical/set3/totalhairs_3305_marinewater.csv",header=FALSE)
summary(marinewater23.totals)
```

```
##        V1                V2                V3                V4
##  Min.   :0.01044   Min.   :0.2956   Min.   :0.01044   Min.   :0.2956
##  1st Qu.:0.25481   1st Qu.:0.6821   1st Qu.:0.25481   1st Qu.:0.6821
##  Median :0.46387   Median :0.9390   Median :0.46387   Median :0.9390
##  Mean   :0.50782   Mean   :0.9555   Mean   :0.50782   Mean   :0.9555
##  3rd Qu.:0.75210   3rd Qu.:1.2058   3rd Qu.:0.75210   3rd Qu.:1.2058
##  Max.   :1.10180   Max.   :1.7652   Max.   :1.10180   Max.   :1.7652
##        V5
##  Min.   :-1.640e-08
##  1st Qu.: 0.000e+00
##  Median : 0.000e+00
##  Mean   : 1.084e-04
##  3rd Qu.: 4.666e-05
##  Max.   : 1.420e-03
```

Loads data, Blue crab in water long duration, condition 2

```
marinewaterTswap3.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimoz
u-main/practical/set3/pertimestep_3323_marinewaterTswap.csv",header=FALSE)
summary(marinewaterTswap3.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.00000
##  1st Qu.:0.03464   1st Qu.:0.06038
##  Median :0.06927   Median :0.15447
##  Mean   :0.06927   Mean   :0.12603
##  3rd Qu.:0.10391   3rd Qu.:0.19004
##  Max.   :0.13850   Max.   :0.19606
```

```
marinewaterTswap3.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set3/totalhairs_3323_marinewaterTswap.csv",header=FALSE)
summary(marinewaterTswap3.totals)
```

```
##        V1                V2                V3                V4
##  Min.   :0.01044   Min.   :0.2956   Min.   :0.01044   Min.   :0.2956
##  1st Qu.:0.25481   1st Qu.:0.6821   1st Qu.:0.25481   1st Qu.:0.6821
##  Median :0.46387   Median :0.9390   Median :0.46387   Median :0.9390
##  Mean   :0.50782   Mean   :0.9555   Mean   :0.50782   Mean   :0.9555
##  3rd Qu.:0.75210   3rd Qu.:1.2058   3rd Qu.:0.75210   3rd Qu.:1.2058
##  Max.   :1.10180   Max.   :1.7652   Max.   :1.10180   Max.   :1.7652
##        V5
##  Min.   :-4.000e-09
##  1st Qu.: 0.000e+00
##  Median : 2.080e-04
##  Mean   : 9.564e-04
##  3rd Qu.: 1.532e-03
##  Max.   : 7.544e-03
```

Loads data, Blue crab in air, Condition 2

```
marineair23.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set3/pertimestep_3311_marineair.csv",header=FALSE)
summary(marineair23.perstepdata)
```

```
##       V1              V2
##  Min.   :0.00   Min.   :0.00000
##  1st Qu.:0.07   1st Qu.:0.09522
##  Median :0.14   Median :0.09658
##  Mean   :0.14   Mean   :0.09251
##  3rd Qu.:0.21   3rd Qu.:0.09773
##  Max.   :0.28   Max.   :0.09867
```

```
marineair23.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/prac
tical/set3/totalhairs_3311_marineair.csv",header=FALSE)
summary(marineair23.totals)
```

```
##       V1              V2              V3              V4
##  Min.   :0.2510   Min.   :0.7466   Min.   :0.2510   Min.   :0.7465
##  1st Qu.:0.5469   1st Qu.:1.0381   1st Qu.:0.5469   1st Qu.:1.0383
##  Median :0.7689   Median :1.2432   Median :0.7689   Median :1.2430
##  Mean   :0.7905   Mean   :1.2547   Mean   :0.7905   Mean   :1.2547
##  3rd Qu.:1.0366   3rd Qu.:1.4455   3rd Qu.:1.0366   3rd Qu.:1.4453
##  Max.   :1.3135   Max.   :1.8657   Max.   :1.3134   Max.   :1.8654
##       V5
##  Min.   :8.400e-08
##  1st Qu.:5.584e-06
##  Median :5.963e-05
##  Mean   :4.813e-04
##  3rd Qu.:3.331e-04
##  Max.   :6.860e-03
```

Loads data, Blue crab in air long duration, condition 2

```
marineairTswap3.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-
main/practical/set3/pertimestep_3320_marineairTswap.csv",header=FALSE)
summary(marineairTswap3.perstepdata)
```

```
##        V1                V2
##  Min.   :0.00000   Min.   :0.0000
##  1st Qu.:0.03465   1st Qu.:0.1827
##  Median :0.06929   Median :0.3825
##  Mean   :0.06929   Mean   :0.3165
##  3rd Qu.:0.10394   3rd Qu.:0.4578
##  Max.   :0.13850   Max.   :0.4582
```

```
marineairTswap3.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/
practical/set3/totalhairs_3320_marineairTswap.csv",header=FALSE)
summary(marineairTswap3.totals)
```

```
##        V1               V2               V3               V4
##  Min.   :0.2510   Min.   :0.7466   Min.   :0.2510   Min.   :0.7465
##  1st Qu.:0.5469   1st Qu.:1.0381   1st Qu.:0.5469   1st Qu.:1.0383
##  Median :0.7689   Median :1.2432   Median :0.7689   Median :1.2430
##  Mean   :0.7905   Mean   :1.2547   Mean   :0.7905   Mean   :1.2547
##  3rd Qu.:1.0366   3rd Qu.:1.4455   3rd Qu.:1.0366   3rd Qu.:1.4453
##  Max.   :1.3135   Max.   :1.8657   Max.   :1.3134   Max.   :1.8654
##        V5
##  Min.   :4.730e-07
##  1st Qu.:3.199e-05
##  Median :3.206e-04
##  Mean   :2.235e-03
##  3rd Qu.:1.699e-03
##  Max.   :3.152e-02
```

Creates C/Cinf for per time step data, Condition 1

```
marinewater13.perstepdata$C<-marinewater13.perstepdata$V2/cinf3.marinewater
marineair13.perstepdata$C<-marineair13.perstepdata$V2/cinf3.marineair
marinewaterdair3.perstepdata$C<-marinewaterdair3.perstepdata$V2/cinf3.marineair
marineairdwater3.perstepdata$C<-marineairdwater3.perstepdata$V2/cinf3.marinewater
```

Adjusts for capture distance.

```
marinewater13.perstepdata$Cadj<-marinewater13.perstepdata$C/marine.d
marineair13.perstepdata$Cadj<-marineair13.perstepdata$C/marine.d
marinewaterdair3.perstepdata$Cadj<-marinewaterdair3.perstepdata$C/marine.d
marineairdwater3.perstepdata$Cadj<-marineairdwater3.perstepdata$C/marine.d
```

Creates C/Cinf for per hair data, Condition 1

```
marinewater13.totals$V5<-marinewater13.totals$V5/cinf3.marinewater
marinewater13.totals$V5<-marinewater13.totals$V5/marine.d  #Uncomment for standardizing per hair
data by capture area
marineair13.totals$V5<-marineair13.totals$V5/cinf3.marineair
marineair13.totals$V5<-marineair13.totals$V5/marine.d     #Uncomment for standardizing per hair
data by capture area
marinewaterdair3.totals$V5<-marinewaterdair3.totals$V5/cinf3.marineair
marinewaterdair3.totals$V5<-marinewaterdair3.totals$V5/marine.d  #Uncomment for standardizing pe
r hair data by capture area
marineairdwater3.totals$V5<-marineairdwater3.totals$V5/cinf3.marinewater
marineairdwater3.totals$V5<-marineairdwater3.totals$V5/marine.d      #Uncomment for standardizin
g per hair data by capture area
```

Creates C/Cinf for per time step data, Condition 2

```
marinewater23.perstepdata$C<-marinewater23.perstepdata$V2/cinf3.marinewater
marineair23.perstepdata$C<-marineair23.perstepdata$V2/cinf3.marineair
```

Adjusts for capture distance.

```
marinewater23.perstepdata$Cadj<-marinewater23.perstepdata$C/marine.d
marineair23.perstepdata$Cadj<-marineair23.perstepdata$C/marine.d
marinewaterTswap3.perstepdata$C<-marinewaterTswap3.perstepdata$V2/cinf3.marinewater
marineairTswap3.perstepdata$C<-marineairTswap3.perstepdata$V2/cinf3.marineair
marinewaterTswap3.perstepdata$Cadj<-marinewaterTswap3.perstepdata$C/marine.d
marineairTswap3.perstepdata$Cadj<-marineairTswap3.perstepdata$C/marine.d
```

Creates C/Cinf for per hair data, Condition 2

```
marinewater23.totals$V5<-marinewater23.totals$V5/cinf3.marinewater
marinewater23.totals$V5<-marinewater23.totals$V5/marine.d  #Uncomment for standardizing per hair
data by capture area
marinewaterTswap3.totals$V5<-marinewaterTswap3.totals$V5/cinf3.marinewater
marinewaterTswap3.totals$V5<-marinewaterTswap3.totals$V5/marine.d  #Uncomment for standardizing
 per hair data by capture area
marineair23.totals$V5<-marineair23.totals$V5/cinf3.marineair
marineair23.totals$V5<-marineair23.totals$V5/marine.d       #Uncomment for standardizing per hair
data by capture area
marineairTswap3.totals$V5<-marineairTswap3.totals$V5/cinf3.marineair
marineairTswap3.totals$V5<-marineairTswap3.totals$V5/marine.d        #Uncomment for standardizing
 per hair data by capture area
```

Loads data, Terrestrial crab in water, Condition 1

```
hermitwater13.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-ma
in/practical/set3/pertimestep_3173_hermitwater.csv",header=FALSE)
summary(hermitwater13.perstepdata)
```

```
##       V1               V2
## Min.   :0.00000   Min.   :0.000e+00
## 1st Qu.:0.03466   1st Qu.:1.673e-06
## Median :0.06932   Median :3.319e-05
## Mean   :0.06932   Mean   :4.625e-05
## 3rd Qu.:0.10397   3rd Qu.:8.826e-05
## Max.   :0.13850   Max.   :1.282e-04
```

```
hermitwater13.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/pr
actical/set3/totalhairs_3173_hermitwater.csv",header=FALSE)
summary(hermitwater13.totals)
```

```
##       V1               V2               V3
## Min.   :0.06138   Min.   :0.03493   Min.   :8.389e-08
## 1st Qu.:0.06849   1st Qu.:0.06867   1st Qu.:1.281e-06
## Median :0.07186   Median :0.09969   Median :5.630e-06
## Mean   :0.07144   Mean   :0.09956   Mean   :1.068e-05
## 3rd Qu.:0.07481   3rd Qu.:0.12864   3rd Qu.:1.595e-05
## Max.   :0.08243   Max.   :0.17090   Max.   :4.430e-05
```

Loads data, Terrestrial crab in water PIV with air D coefficient

```
hermitwaterdair3.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu
-main/practical/set3/pertimestep_3178_hermitwaterDswap.csv",header=FALSE)
summary(hermitwaterdair3.perstepdata)
```

```
##       V1               V2
## Min.   :0.00000   Min.   :0.000000
## 1st Qu.:0.03466   1st Qu.:0.003243
## Median :0.06931   Median :0.003243
## Mean   :0.06931   Mean   :0.003211
## 3rd Qu.:0.10397   3rd Qu.:0.003243
## Max.   :0.13850   Max.   :0.003243
```

```
hermitwaterdair3.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set3/totalhairs_3178_hermitwaterDswap.csv",header=FALSE)
summary(hermitwaterdair3.totals)
```

```
##        V1                V2                V3
##  Min.    :0.06138   Min.    :0.03493   Min.    :1.328e-05
##  1st Qu.:0.06849   1st Qu.:0.06867   1st Qu.:1.405e-04
##  Median :0.07186   Median :0.09969   Median :2.514e-04
##  Mean    :0.07144   Mean    :0.09956   Mean    :2.703e-04
##  3rd Qu.:0.07481   3rd Qu.:0.12864   3rd Qu.:3.742e-04
##  Max.    :0.08243   Max.    :0.17090   Max.    :6.697e-04
```

Loads data, Terrestrial crab in air

```
hermitair13.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set3/pertimestep_3175_hermitair.csv",header=FALSE)
summary(hermitair13.perstepdata)
```

```
##        V1                V2
##  Min.    :0.00000   Min.    :0.000000
##  1st Qu.:0.03466   1st Qu.:0.003412
##  Median :0.06931   Median :0.003412
##  Mean    :0.06931   Mean    :0.003378
##  3rd Qu.:0.10397   3rd Qu.:0.003412
##  Max.    :0.13850   Max.    :0.003412
```

```
hermitair13.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/prac
tical/set3/totalhairs_3175_hermitair.csv",header=FALSE)
summary(hermitair13.totals)
```

```
##        V1                V2                V3
##  Min.    :0.05111   Min.    :0.04193   Min.    :1.485e-05
##  1st Qu.:0.05822   1st Qu.:0.07568   1st Qu.:1.528e-04
##  Median :0.06159   Median :0.10669   Median :2.411e-04
##  Mean    :0.06116   Mean    :0.10656   Mean    :2.843e-04
##  3rd Qu.:0.06454   3rd Qu.:0.13565   3rd Qu.:3.934e-04
##  Max.    :0.07215   Max.    :0.17790   Max.    :6.928e-04
```

Loads data, Terrestrial crab in air PIV with water D coefficient

```
hermitairdwater3.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu
-main/practical/set3/pertimestep_3177_hermitairDswap.csv",header=FALSE)
summary(hermitairdwater3.perstepdata)
```

```
##        V1              V2
##  Min.   :0.00000   Min.   :0.000e+00
##  1st Qu.:0.03465   1st Qu.:3.121e-05
##  Median :0.06929   Median :2.116e-04
##  Mean   :0.06929   Mean   :1.791e-04
##  3rd Qu.:0.10393   3rd Qu.:3.025e-04
##  Max.   :0.13850   Max.   :3.363e-04
```

```
hermitairdwater3.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set3/totalhairs_3177_hermitairDswap.csv",header=FALSE)
summary(hermitairdwater3.totals)
```

```
##        V1              V2               V3
##  Min.   :0.05111   Min.   :0.04193   Min.   :7.618e-08
##  1st Qu.:0.05822   1st Qu.:0.07568   1st Qu.:5.943e-06
##  Median :0.06159   Median :0.10669   Median :1.203e-05
##  Mean   :0.06116   Mean   :0.10656   Mean   :2.802e-05
##  3rd Qu.:0.06454   3rd Qu.:0.13565   3rd Qu.:4.222e-05
##  Max.   :0.07215   Max.   :0.17790   Max.   :1.147e-04
```

Loads data, Terrestrial crab in water, Condition 2

```
hermitwater23.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-ma
in/practical/set3/pertimestep_3174_hermitwater.csv",header=FALSE)
summary(hermitwater23.perstepdata)
```

```
##        V1              V2
##  Min.   :0.00000   Min.   :0.000e+00
##  1st Qu.:0.03466   1st Qu.:2.644e-06
##  Median :0.06932   Median :1.566e-04
##  Mean   :0.06932   Mean   :3.840e-04
##  3rd Qu.:0.10397   3rd Qu.:7.346e-04
##  Max.   :0.13850   Max.   :1.372e-03
```

```
hermitwater23.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/pr
actical/set3/totalhairs_3174_hermitwater.csv",header=FALSE)
summary(hermitwater23.totals)
```

```
##        V1              V2               V3
##  Min.   :0.06138   Min.   :0.03493   Min.   :8.992e-07
##  1st Qu.:0.06849   1st Qu.:0.06867   1st Qu.:1.209e-05
##  Median :0.07186   Median :0.09969   Median :5.924e-05
##  Mean   :0.07144   Mean   :0.09956   Mean   :1.144e-04
##  3rd Qu.:0.07481   3rd Qu.:0.12864   3rd Qu.:1.426e-04
##  Max.   :0.08243   Max.   :0.17090   Max.   :5.395e-04
```

Loads data, Terrestrial crab in water, short duration of marine crab

```
hermitwaterTswap3.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimoz
u-main/practical/set3/pertimestep_3180_hermitwaterTswap.csv",header=FALSE)
summary(hermitwaterTswap3.perstepdata)
```

```
##       V1                V2
##  Min.   :0.00000   Min.   :0.000e+00
##  1st Qu.:0.01400   1st Qu.:2.670e-09
##  Median :0.02801   Median :2.186e-07
##  Mean   :0.06011   Mean   :2.062e-05
##  3rd Qu.:0.07024   3rd Qu.:5.454e-06
##  Max.   :0.27989   Max.   :1.817e-04
```

```
hermitwaterTswap3.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set3/totalhairs_3180_hermitwaterTswap.csv",header=FALSE)
summary(hermitwaterTswap3.totals)
```

```
##       V1                V2                V3
##  Min.   :0.06138   Min.   :0.03493   Min.   :1.843e-08
##  1st Qu.:0.06849   1st Qu.:0.06867   1st Qu.:2.068e-06
##  Median :0.07186   Median :0.09969   Median :8.227e-06
##  Mean   :0.07144   Mean   :0.09956   Mean   :1.514e-05
##  3rd Qu.:0.07481   3rd Qu.:0.12864   3rd Qu.:1.173e-05
##  Max.   :0.08243   Max.   :0.17090   Max.   :8.250e-05
```

Loads data, Terrestrial crab in air, Condition 2

```
hermitair23.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-mai
n/practical/set3/pertimestep_3176_hermitair.csv",header=FALSE)
summary(hermitair23.perstepdata)
```

```
##       V1                V2
##  Min.   :0.00000   Min.   :0.0000
##  1st Qu.:0.03466   1st Qu.:0.1749
##  Median :0.06931   Median :0.3501
##  Mean   :0.06931   Mean   :0.2858
##  3rd Qu.:0.10397   3rd Qu.:0.4006
##  Max.   :0.13850   Max.   :0.4006
```

```
hermitair23.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/prac
tical/set3/totalhairs_3176_Hermitair.csv",header=FALSE)
summary(hermitair23.totals)
```

```
##       V1              V2              V3
## Min.   :0.05111   Min.   :0.04193   Min.   :0.001746
## 1st Qu.:0.05822   1st Qu.:0.07568   1st Qu.:0.017910
## Median :0.06159   Median :0.10669   Median :0.028223
## Mean   :0.06116   Mean   :0.10656   Mean   :0.033387
## 3rd Qu.:0.06454   3rd Qu.:0.13565   3rd Qu.:0.046080
## Max.   :0.07215   Max.   :0.17790   Max.   :0.081198
```

Loads data, Terrestrial crab in water, short duration of marine crab

```
hermitairTswap3.perstepdata<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-
main/practical/set3/pertimestep_3179_hermitairTswap.csv",header=FALSE)
summary(hermitairTswap3.perstepdata)
```

```
##       V1              V2
## Min.   :0.00000   Min.   :0.00000
## 1st Qu.:0.07001   1st Qu.:0.08213
## Median :0.14003   Median :0.08213
## Mean   :0.14003   Mean   :0.07970
## 3rd Qu.:0.21003   3rd Qu.:0.08213
## Max.   :0.28000   Max.   :0.08213
```

```
hermitairTswap3.totals<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/
practical/set3/totalhairs_3179_hermitairTswap.csv",header=FALSE)
summary(hermitairTswap3.totals)
```

```
##       V1              V2              V3
## Min.   :0.05111   Min.   :0.04193   Min.   :0.0003568
## 1st Qu.:0.05822   1st Qu.:0.07568   1st Qu.:0.0036723
## Median :0.06159   Median :0.10669   Median :0.0057875
## Mean   :0.06116   Mean   :0.10656   Mean   :0.0068445
## 3rd Qu.:0.06454   3rd Qu.:0.13565   3rd Qu.:0.0094597
## Max.   :0.07215   Max.   :0.17790   Max.   :0.0166950
```

Creates C/Cinf for per time step data, Condition 1

```
hermitwater13.perstepdata$C<-hermitwater13.perstepdata$V2/cinf3.hermitwater
hermitair13.perstepdata$C<-hermitair13.perstepdata$V2/cinf3.hermitair
hermitwaterdair3.perstepdata$C<-hermitwaterdair3.perstepdata$V2/cinf3.hermitair
hermitairdwater3.perstepdata$C<-hermitairdwater3.perstepdata$V2/cinf3.hermitwater
```

Adjusts for capture distance.

```
hermitwater13.perstepdata$Cadj<-hermitwater13.perstepdata$C/hermit.d
hermitair13.perstepdata$Cadj<-hermitair13.perstepdata$C/hermit.d
hermitwaterdair3.perstepdata$Cadj<-hermitwaterdair3.perstepdata$C/hermit.d
hermitairdwater3.perstepdata$Cadj<-hermitairdwater3.perstepdata$C/hermit.d
```

Creates C/Cinf for per hair data

```
hermitwater13.totals$V3<-hermitwater13.totals$V3/cinf3.hermitwater
hermitwater13.totals$V3<-hermitwater13.totals$V3/hermit.d   #Uncomment for standardizing per hair
data by capture area
hermitair13.totals$V3<-hermitair13.totals$V3/cinf3.hermitair
hermitair13.totals$V3<-hermitair13.totals$V3/hermit.d        #Uncomment for standardizing per hair
data by capture area
hermitairdwater3.totals$V3<-hermitairdwater3.totals$V3/cinf3.hermitwater
hermitairdwater3.totals$V3<-hermitairdwater3.totals$V3/hermit.d
hermitwaterdair3.totals$V3<-hermitwaterdair3.totals$V3/cinf3.hermitair
hermitwaterdair3.totals$V3<-hermitwaterdair3.totals$V3/hermit.d
```

Creates C/Cinf for per time step data, Condition 2

```
hermitwater23.perstepdata$C<-hermitwater23.perstepdata$V2/cinf3.hermitwater
hermitair23.perstepdata$C<-hermitair23.perstepdata$V2/cinf3.hermitair
hermitwaterTswap3.perstepdata$C<-hermitwaterTswap3.perstepdata$V2/cinf3.hermitwater
hermitairTswap3.perstepdata$C<-hermitairTswap3.perstepdata$V2/cinf3.hermitair
```

Adjusts for capture distance.

```
hermitwater23.perstepdata$Cadj<-hermitwater23.perstepdata$C/hermit.d
hermitair23.perstepdata$Cadj<-hermitair23.perstepdata$C/hermit.d
hermitwaterTswap3.perstepdata$Cadj<-hermitwaterTswap3.perstepdata$C/hermit.d
hermitairTswap3.perstepdata$Cadj<-hermitairTswap3.perstepdata$C/hermit.d
```

Creates C/Cinf for per hair data, Condition 2

```
hermitwater23.totals$V3<-hermitwater23.totals$V3/cinf3.hermitwater
hermitwater23.totals$V3<-hermitwater23.totals$V3/hermit.d  #Uncomment for standardizing per hair
data by capture area
hermitair23.totals$V3<-hermitair23.totals$V3/cinf3.hermitair
hermitair23.totals$V3<-hermitair23.totals$V3/hermit.d      #Uncomment for standardizing per hair
data by capture area
hermitwaterTswap3.totals$V3<-hermitwaterTswap3.totals$V3/cinf3.hermitwater
hermitwaterTswap3.totals$V3<-hermitwaterTswap3.totals$V3/hermit.d  #Uncomment for standardizing
 per hair data by capture area
hermitairTswap3.totals$V3<-hermitairTswap3.totals$V3/cinf3.hermitair
hermitairTswap3.totals$V3<-hermitairTswap3.totals$V3/hermit.d        #Uncomment for standardizing
 per hair data by capture area
```

##install.packages("signal")##install this package for the first time ##install.packages("rgl") #install this package for the first time

```
library(signal)
```

```
## Warning: package 'signal' was built under R version 4.0.5
```

```
##
## Attaching package: 'signal'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, poly
```

```
library(rgl)
```

```
## Warning: package 'rgl' was built under R version 4.0.5
```

```
library(plotrix)
```

```
##
## Attaching package: 'plotrix'
```

```
## The following object is masked from 'package:rgl':
##
##     mtext3d
```

```
library(ggplot2)
require(plotrix)
require(ggplot2)
library(cowplot)
require(cowplot)
```

```r
n=3     #number of replicates


findMeans<-function(set1data.time,set1data.Cadj,set2data.time,set2data.Cadj,set3data.time,set3da
ta.Cadj){
    if(length(set1data.Cadj)==length(set2data.Cadj) & length(set2data.Cadj)==length(set3data.Cad
j)){
        meanCadj<-matrix(0,length(set1data.time),1)
        SDCadj<-matrix(0,length(set1data.time),1)
        flux<-matrix(0,length(set1data.time),1)
        for (i in 1:length(set1data.time)){
            a<-c(set1data.Cadj[i],set2data.Cadj[i],set3data.Cadj[i])
            meanCadj[i]<-mean(a)
            SDCadj[i]<-sd(a)
        }
        for(i in 2:length(flux)){
            flux[i] = abs(meanCadj[i+1]-meanCadj[i])/abs(set1data.time[i+1]-set1data.time[i])
        }
        dataresult<-data.frame(set1data.time,set1data.Cadj,set2data.Cadj,set3data.Cadj,meanCadj,
SDCadj,flux)
        names(dataresult)<-c("time","set1","set2","set3","mean","SD","flux")
        return(dataresult)

    } else{
        if(length(set1data.Cadj)<=length(set2data.Cadj) & length(set1data.Cadj)<=length(set3dat
a.Cadj)){
            timeint<-set1data.time
        } else if (length(set2data.Cadj)<=length(set1data.Cadj) & length(set2data.Cadj)<=length
(set3data.Cadj)) {
            timeint<-set2data.time
        } else if(length(set3data.Cadj)<=length(set1data.Cadj) & length(set3data.Cadj)<=length(s
et2data.Cadj)) {
            timeint<-set3data.time
        } else {
            timeint<-set1data.time
        }
        set1dataint.Cadj<-interp1(set1data.time,set1data.Cadj,timeint,method=c("linear"),extrap=
FALSE)
        set2dataint.Cadj<-interp1(set2data.time,set2data.Cadj,timeint,method=c("linear"),extrap=
FALSE)
        set3dataint.Cadj<-interp1(set3data.time,set3data.Cadj,timeint,method=c("linear"),extrap=
FALSE)

        meanCadj<-matrix(0,length(timeint),1)
        SDCadj<-matrix(0,length(timeint),1)
        flux<-matrix(0,length(timeint),1)
        for (i in 1:length(timeint)){
            a<-c(set1dataint.Cadj[i],set2dataint.Cadj[i],set3dataint.Cadj[i])
            meanCadj[i]<-mean(a)
            SDCadj[i]<-sd(a)
        }
        for(i in 2:length(flux)){
            flux[i] = abs(meanCadj[i+1]-meanCadj[i])/abs(timeint[i+1]-timeint[i])
        }
```

```
        dataresult<-data.frame(timeint,set1dataint.Cadj,set2dataint.Cadj,set3dataint.Cadj,meanCa
dj,SDCadj,flux)
        names(dataresult)<-c("time","set1","set2","set3","mean","SD","flux")
        return(dataresult)
    }
}
```

```r
findMeans2<-function(set1data.time,set1data.Cadj,set2data.time,set2data.Cadj){
    if(length(set1data.Cadj)==length(set2data.Cadj)){
        meanCadj<-matrix(0,length(set1data.time),1)
        SDCadj<-matrix(0,length(set1data.time),1)
        flux<-matrix(0,length(set1data.time),1)
        for (i in 1:length(set1data.time)){
            a<-c(set1data.Cadj[i],set2data.Cadj[i])
            meanCadj[i]<-mean(a)
            SDCadj[i]<-sd(a)
        }
        #for(i in 2:length(flux)){
        #    flux[i] = abs(meanCadj[i+1]-meanCadj[i])/abs(set1data.time[i+1]-set1data.time[i])
        #}
        dataresult<-data.frame(set1data.time,set1data.Cadj,set2data.Cadj,meanCadj,SDCadj,flux)
        names(dataresult)<-c("time","set1","set2","mean","SD","flux")
        return(dataresult)

    } else{
        if(length(set1data.Cadj)<=length(set2data.Cadj)){
            timeint<-set1data.time
        } else if (length(set2data.Cadj)<=length(set1data.Cadj) & length(set2data.Cadj)<=length
(set3data.Cadj)) {
            timeint<-set2data.time
        #} else if(length(set3data.Cadj)<=length(set1data.Cadj) & length(set3data.Cadj)<=length
(set2data.Cadj)) {
        #    timeint<-set3data.time
        } else {
            timeint<-set1data.time
        }
        set1dataint.Cadj<-interp1(set1data.time,set1data.Cadj,timeint,method=c("linear"),extrap=
FALSE)
        set2dataint.Cadj<-interp1(set2data.time,set2data.Cadj,timeint,method=c("linear"),extrap=
FALSE)


        meanCadj<-matrix(0,length(timeint),1)
        SDCadj<-matrix(0,length(timeint),1)
        flux<-matrix(0,length(timeint),1)
        for (i in 1:length(timeint)){
            a<-c(set1dataint.Cadj[i],set2dataint.Cadj[i])
            meanCadj[i]<-mean(a)
            SDCadj[i]<-sd(a)
        }
        for(i in 2:length(flux)){
            flux[i] = abs(meanCadj[i+1]-meanCadj[i])/abs(timeint[i+1]-timeint[i])
        }


        dataresult<-data.frame(timeint,set1dataint.Cadj,set2dataint.Cadj,meanCadj,SDCadj,flux)
        names(dataresult)<-c("time","set1","set2","mean","SD","flux")
        return(dataresult)
    }
}
```

Hair Calculations

Hermit Crabs

```
hermithairsset1<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/practic
al/set1/hermithairseffectarea.csv",header=FALSE)

hermithairsset2<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/practic
al/set2/hermithairseffectarea.csv",header=FALSE)

hermithairsset3<-read.csv("C:/Users/isaac/OneDrive/Desktop/cs510-qe-aug2021-nwimozu-main/practic
al/set3/hermithairseffectarea.csv",header=FALSE)




hermitair1.d<-((hermithairsset1$V1+hermithairsset2$V1+hermithairsset3$V1)/n)*hermit.d
hermitwater1.d<-((hermithairsset1$V2+hermithairsset2$V2+hermithairsset3$V2)/n)*hermit.d
hermitwaterdair.d<-((hermithairsset1$V3+hermithairsset2$V3+hermithairsset3$V3)/n)*hermit.d
hermitairdwater.d<-((hermithairsset1$V4+hermithairsset2$V4+hermithairsset3$V4)/n)*hermit.d
hermitair2.d<-((hermithairsset1$V5+hermithairsset2$V5+hermithairsset3$V5)/n)*hermit.d
hermitwater2.d<-((hermithairsset1$V6+hermithairsset2$V6+hermithairsset3$V6)/n)*hermit.d
hermitwaterTswap.d<-((hermithairsset1$V7+hermithairsset2$V7+hermithairsset3$V7)/n)*hermit.d
hermitairTswap.d<-((hermithairsset1$V8+hermithairsset2$V8+hermithairsset3$V8)/n)*hermit.d

hermitair1totals<-findMeans(hermitair11.totals$V1,hermitair11.totals$V3/hermitair1.d,hermitair1
2.totals$V1,hermitair12.totals$V3/hermitair1.d,hermitair13.totals$V1,hermitair13.totals$V3/hermi
tair1.d)
hermitair1totals$ratios<-hermitair1totals$mean/sum(hermitair1totals$mean)*100

hermitwater1totals<-findMeans(hermitwater11.totals$V1,hermitwater11.totals$V3/hermitwater1.d,her
mitwater12.totals$V1,hermitwater12.totals$V3/hermitwater1.d,hermitwater13.totals$V1,hermitwater1
3.totals$V3/hermitwater1.d)
hermitwater1totals$ratios<-hermitwater1totals$mean/sum(hermitwater1totals$mean)*100

hermitairdwatertotals<-findMeans(hermitairdwater1.totals$V1,hermitairdwater1.totals$V3/hermitair
dwater.d,hermitairdwater2.totals$V1,hermitairdwater2.totals$V3/hermitairdwater.d,hermitairdwater
3.totals$V1,hermitairdwater3.totals$V3/hermitairdwater.d)
hermitairdwatertotals$ratios<-hermitairdwatertotals$mean/sum(hermitairdwatertotals$mean)*100

hermitwaterdairtotals<-findMeans(hermitwaterdair1.totals$V1,hermitwaterdair1.totals$V3/hermitwat
erdair.d,hermitwaterdair2.totals$V1,hermitwaterdair2.totals$V3/hermitwaterdair.d,hermitwaterdair
3.totals$V1,hermitwaterdair3.totals$V3/hermitwaterdair.d)
hermitwaterdairtotals$ratios<-hermitwaterdairtotals$mean/sum(hermitwaterdairtotals$mean)*100

hermitair2totals<-findMeans(hermitair21.totals$V1,hermitair21.totals$V3/hermitair2.d,hermitair2
2.totals$V1,hermitair22.totals$V3/hermitair2.d,hermitair23.totals$V1,hermitair23.totals$V3/hermi
tair2.d)
hermitair2totals$ratios<-hermitair2totals$mean/sum(hermitair2totals$mean)*100

hermitwater2totals<-findMeans(hermitwater21.totals$V1,hermitwater21.totals$V3/hermitwater2.d,her
mitwater22.totals$V1,hermitwater22.totals$V3/hermitwater2.d,hermitwater23.totals$V1,hermitwater2
3.totals$V3/hermitwater2.d)
hermitwater2totals$ratios<-hermitwater2totals$mean/sum(hermitwater2totals$mean)*100

hermitairTswaptotals<-findMeans(hermitairTswap1.totals$V1,hermitairTswap1.totals$V3/hermitairTsw
ap.d,hermitairTswap2.totals$V1,hermitairTswap2.totals$V3/hermitairTswap.d,hermitairTswap3.totals
```

```
$V1,hermitairTswap3.totals$V3/hermitairTswap.d)
hermitairTswaptotals$ratios<-hermitairTswaptotals$mean/sum(hermitairTswaptotals$mean)*100

hermitwaterTswaptotals<-findMeans(hermitwaterTswap1.totals$V1,hermitwaterTswap1.totals$V3/hermit
waterTswap.d,hermitwaterTswap2.totals$V1,hermitwaterTswap2.totals$V3/hermitwaterTswap.d,hermitwa
terTswap3.totals$V1,hermitwaterTswap3.totals$V3/hermitwaterTswap.d)
hermitwaterTswaptotals$ratios<-hermitwaterTswaptotals$mean/sum(hermitwaterTswaptotals$mean)*100
```

#Setting cutoff for hair inclusion.

```
cutoffuse<-1e-10 # Use -1 for all area
```

Marine Crabs

```
marineair1totals<-findMeans(marineair11.totals$V1,marineair11.totals$V5,marineair12.totals$V1,ma
rineair12.totals$V5,marineair13.totals$V1,marineair13.totals$V5)
marineair1totals$ratios<-marineair1totals$mean/sum(marineair1totals$mean)*100
marineair1.numhairs=length(marineair1totals$mean[marineair1totals$mean>=cutoffuse])
marineair1.d<-marine.d*(marineair1.numhairs/205)
marineair1totals<-findMeans(marineair11.totals$V1,marineair11.totals$V5/marineair1.d,marineair1
2.totals$V1,marineair12.totals$V5/marineair1.d,marineair13.totals$V1,marineair13.totals$V5/marin
eair1.d)

marinewater1totals<-findMeans(marinewater11.totals$V1,marinewater11.totals$V5,marinewater12.tota
ls$V1,marinewater12.totals$V5,marinewater13.totals$V1,marinewater13.totals$V5)
marinewater1totals$ratios<-marinewater1totals$mean/sum(marinewater1totals$mean)*100
marinewater1.numhairs=length(marinewater1totals$mean[marinewater1totals$mean>=cutoffuse])
marinewater1.d<-marine.d*(marinewater1.numhairs/205)
marinewater1totals<-findMeans(marinewater11.totals$V1,marinewater11.totals$V5/marinewater1.d,mar
inewater12.totals$V1,marinewater12.totals$V5/marinewater1.d,marinewater13.totals$V1,marinewater1
3.totals$V5/marinewater1.d)

marineairdwatertotals<-findMeans(marineairdwater1.totals$V1,marineairdwater1.totals$V5,marineair
dwater2.totals$V1,marineairdwater2.totals$V5,marineairdwater3.totals$V1,marineairdwater3.totals
$V5)
marineairdwatertotals$ratios<-marineairdwatertotals$mean/sum(marineairdwatertotals$mean)*100
marineairdwater.numhairs=length(marineairdwatertotals$mean[marineairdwatertotals$mean>=cutoffus
e])
marineairdwater.d<-marine.d*(marineairdwater.numhairs/205)
marineairdwatertotals<-findMeans(marineairdwater1.totals$V1,marineairdwater1.totals$V5/marineair
dwater.d,marineairdwater2.totals$V1,marineairdwater2.totals$V5/marineairdwater.d,marineairdwater
2.totals$V1,marineairdwater3.totals$V5/marineairdwater.d)

marinewaterdairtotals<-findMeans(marinewaterdair1.totals$V1,marinewaterdair1.totals$V5,marinewat
erdair2.totals$V1,marinewaterdair2.totals$V5,marinewaterdair3.totals$V1,marinewaterdair3.totals
$V5)
marinewaterdairtotals$ratios<-marinewaterdairtotals$mean/sum(marinewaterdairtotals$mean)*100
marinewaterdair.numhairs=length(marinewaterdairtotals$mean[marinewaterdairtotals$mean>=cutoffus
e])
marinewaterdair.d<-marine.d*(marinewaterdair.numhairs/205)
marinewaterdairtotals<-findMeans(marinewaterdair1.totals$V1,marinewaterdair1.totals$V5/marinewat
erdair.d,marinewaterdair2.totals$V1,marinewaterdair2.totals$V5/marinewaterdair.d,marinewaterdair
2.totals$V1,marinewaterdair2.totals$V5/marinewaterdair.d)

marineair2totals<-findMeans(marineair21.totals$V1,marineair21.totals$V5,marineair22.totals$V1,ma
rineair22.totals$V5,marineair22.totals$V1,marineair22.totals$V5)
marineair2totals$ratios<-marineair2totals$mean/sum(marineair2totals$mean)*100
marineair2.numhairs=length(marineair2totals$mean[marineair2totals$mean>=cutoffuse])
marineair2.d<-marine.d*(marineair2.numhairs/205)
marineair2totals<-findMeans(marineair21.totals$V1,marineair21.totals$V5/marineair2.d,marineair2
2.totals$V1,marineair22.totals$V5/marineair2.d,marineair22.totals$V1,marineair22.totals$V5/marin
eair2.d)

marinewater2totals<-findMeans(marinewater21.totals$V1,marinewater21.totals$V5,marinewater22.tota
ls$V1,marinewater22.totals$V5,marinewater23.totals$V1,marinewater23.totals$V5)
marinewater2totals$ratios<-marinewater2totals$mean/sum(marinewater2totals$mean)*100
marinewater2.numhairs=length(marinewater2totals$mean[marinewater2totals$mean>=cutoffuse])
```

```
marinewater2.d<-marine.d*(marinewater2.numhairs/205)
marinewater2totals<-findMeans(marinewater21.totals$V1,marinewater21.totals$V5/marinewater2.d,mar
inewater22.totals$V1,marinewater22.totals$V5/marinewater2.d,marinewater22.totals$V1,marinewater2
2.totals$V5/marinewater2.d)


marineairTswaptotals<-findMeans(marineairTswap1.totals$V1,marineairTswap1.totals$V5,marineairTsw
ap2.totals$V1,marineairTswap2.totals$V5,marineairTswap2.totals$V1,marineairTswap2.totals$V5)
marineairTswaptotals$ratios<-marineairTswaptotals$mean/sum(marineairTswaptotals$mean)*100
marineairTswap.numhairs=length(marineairTswaptotals$mean[marineairTswaptotals$mean>=cutoffuse])
marineairTswap.d<-marine.d*(marineairTswap.numhairs/205)
marineairTswaptotals<-findMeans(marineairTswap1.totals$V1,marineairTswap1.totals$V5/marineairTsw
ap.d,marineairTswap2.totals$V1,marineairTswap2.totals$V5/marineairTswap.d,marineairTswap2.totals
$V1,marineairTswap2.totals$V5/marineairTswap.d)


marinewaterTswaptotals<-findMeans(marinewaterTswap1.totals$V1,marinewaterTswap1.totals$V5,marine
waterTswap2.totals$V1,marinewaterTswap2.totals$V5,marinewaterTswap3.totals$V1,marinewaterTswap3.
totals$V5)
marinewaterTswaptotals$ratios<-marinewaterTswaptotals$mean/sum(marinewaterTswaptotals$mean)*100
marinewaterTswap.numhairs=length(marinewaterTswaptotals$mean[marinewaterTswaptotals$mean>=cutoff
use])
marinewaterTswap.d<-marine.d*(marinewaterTswap.numhairs/205)
marinewaterTswaptotals<-findMeans(marinewaterTswap1.totals$V1,marinewaterTswap1.totals$V5/marine
waterTswap.d,marinewaterTswap2.totals$V1,marinewaterTswap2.totals$V5/marinewaterTswap.d,marinewa
terTswap2.totals$V1,marinewaterTswap2.totals$V5/marinewaterTswap.d)
```

Thin filament plot

#calculate mean at each time step

```
hermitair1<-findMeans(hermitair11.perstepdata$V1,hermitair11.perstepdata$Cadj/hermitair1.d,hermi
tair12.perstepdata$V1,hermitair12.perstepdata$Cadj/hermitair1.d,hermitair13.perstepdata$V1,hermi
tair13.perstepdata$Cadj/hermitair1.d)

hermitwater1<-findMeans(hermitwater11.perstepdata$V1,hermitwater11.perstepdata$Cadj/hermitwater
1.d,hermitwater12.perstepdata$V1,hermitwater12.perstepdata$Cadj/hermitwater1.d,hermitwater13.per
stepdata$V1,hermitwater13.perstepdata$Cadj/hermitwater1.d)

marineair1<-findMeans(marineair11.perstepdata$V1,marineair11.perstepdata$Cadj/marineair1.d,marin
eair12.perstepdata$V1,marineair12.perstepdata$Cadj/marineair1.d,marineair13.perstepdata$V1,marin
eair13.perstepdata$Cadj/marineair1.d)

marinewater1<-findMeans(marinewater11.perstepdata$V1,marinewater11.perstepdata$Cadj/marinewater
1.d,marinewater12.perstepdata$V1,marinewater12.perstepdata$Cadj/marinewater1.d,marinewater13.per
stepdata$V1,marinewater13.perstepdata$Cadj/marinewater1.d)



hermitairdwater<-findMeans2(hermitairdwater2.perstepdata$V1,hermitairdwater2.perstepdata$Cadj/he
rmitairdwater.d,hermitairdwater3.perstepdata$V1,hermitairdwater3.perstepdata$Cadj/hermitairdwate
r.d)

hermitwaterdair<-findMeans(hermitwaterdair1.perstepdata$V1,hermitwaterdair1.perstepdata$Cadj/her
mitwaterdair.d,hermitwaterdair2.perstepdata$V1,hermitwaterdair2.perstepdata$Cadj/hermitwaterdai
r.d,hermitwaterdair3.perstepdata$V1,hermitwaterdair3.perstepdata$Cadj/hermitwaterdair.d)

marineairdwater<-findMeans(marineairdwater1.perstepdata$V1,marineairdwater1.perstepdata$Cadj/mar
ineairdwater.d,marineairdwater2.perstepdata$V1,marineairdwater2.perstepdata$Cadj/marineairdwate
r.d,marineairdwater3.perstepdata$V1,marineairdwater3.perstepdata$Cadj/marineairdwater.d)

marinewaterdair<-findMeans(marinewaterdair1.perstepdata$V1,marinewaterdair1.perstepdata$Cadj/mar
inewaterdair.d,marinewaterdair2.perstepdata$V1,marinewaterdair2.perstepdata$Cadj/marinewaterdai
r.d,marinewaterdair3.perstepdata$V1,marinewaterdair3.perstepdata$Cadj/marinewaterdair.d)
```

Thick filament plot

#calculate mean at each time step

```
hermitair2<-findMeans(hermitair21.perstepdata$V1,hermitair21.perstepdata$Cadj/hermitair2.d,hermi
tair22.perstepdata$V1,hermitair22.perstepdata$Cadj/hermitair2.d,hermitair23.perstepdata$V1,hermi
tair23.perstepdata$Cadj/hermitair2.d)

hermitwater2<-findMeans(hermitwater21.perstepdata$V1,hermitwater21.perstepdata$Cadj/hermitwater
2.d,hermitwater22.perstepdata$V1,hermitwater22.perstepdata$Cadj/hermitwater2.d,hermitwater23.per
stepdata$V1,hermitwater23.perstepdata$Cadj/hermitwater2.d)

marineair2<-findMeans(marineair21.perstepdata$V1,marineair21.perstepdata$Cadj/marineair2.d,marin
eair22.perstepdata$V1,marineair22.perstepdata$Cadj/marineair2.d,marineair23.perstepdata$V1,marin
eair23.perstepdata$Cadj/marineair2.d)

marinewater2<-findMeans(marinewater21.perstepdata$V1,marinewater21.perstepdata$Cadj/marinewater
2.d,marinewater22.perstepdata$V1,marinewater22.perstepdata$Cadj/marinewater2.d,marinewater23.per
stepdata$V1,marinewater23.perstepdata$Cadj/marinewater2.d)

hermitairTswap<-findMeans(hermitairTswap1.perstepdata$V1,hermitairTswap1.perstepdata$Cadj/hermit
airTswap.d,hermitairTswap2.perstepdata$V1,hermitairTswap2.perstepdata$Cadj/hermitairTswap.d,herm
itairTswap3.perstepdata$V1,hermitairTswap3.perstepdata$Cadj/hermitairTswap.d)

hermitwaterTswap<-findMeans(hermitwaterTswap1.perstepdata$V1,hermitwaterTswap1.perstepdata$Cadj/
hermitwaterTswap.d,hermitwaterTswap2.perstepdata$V1,hermitwaterTswap2.perstepdata$Cadj/hermitwat
erTswap.d,hermitwaterTswap3.perstepdata$V1,hermitwaterTswap3.perstepdata$Cadj/hermitwaterTswap.
d)

marineairTswap<-findMeans(marineairTswap1.perstepdata$V1,marineairTswap1.perstepdata$Cadj/marine
airTswap.d,marineairTswap2.perstepdata$V1,marineairTswap2.perstepdata$Cadj/marineairTswap.d,mari
neairTswap3.perstepdata$V1,marineairTswap3.perstepdata$Cadj/marineairTswap.d)

marinewaterTswap<-findMeans(marinewaterTswap1.perstepdata$V1,marinewaterTswap1.perstepdata$Cadj/
marinewaterTswap.d,marinewaterTswap2.perstepdata$V1,marinewaterTswap2.perstepdata$Cadj/marinewat
erTswap.d,marinewaterTswap3.perstepdata$V1,marinewaterTswap3.perstepdata$Cadj/marinewaterTswap.
d)
```

PLOTS

```
marine.flickx = c(0.0152)
marine.returnx = c(0.0152+0.025)
hermit.flickx = c(0.0782)
hermit.returnx = c(0.0782+0.0603)
```

```
p1<-ggplot(marineair1,aes(time))+ylab(expression(C/(C[infinity]%.%d)~(mm^-1)))+xlab('Time (s)')+
ylim(min(hermitwater1$mean-qt(0.975,df=2)*hermitwater1$SD),0.15)+xlim(0,hermit.returnx)+geom_lin
e(aes(y=mean),colour="red",lty=1)+geom_ribbon(aes(ymin=mean-qt(0.975,df=2)*SD,ymax=mean+qt(0.975
,df=2)*SD),fill="red",alpha=0.2) +geom_line(data=marinewater1,aes(x=time,y=mean),colour="blue",l
ty=1)+geom_ribbon(data=marinewater1,aes(ymin=mean- qt(0.975,df=2)*SD,ymax=mean+qt(0.975,df=2)*S
D),fill="blue",alpha=0.2) +geom_line(data=hermitwater1,aes(x=time,y=mean),colour="blue",lty=2)+g
eom_ribbon(data=hermitwater1,aes(ymin=mean-qt(0.975,df=2)*SD,ymax=mean+qt(0.975,df=2)*SD),fill=
"blue",alpha=0.2) +geom_line(data=hermitair1,aes(x=time,y=mean),colour="red",lty=2)+geom_ribbon
(data=hermitair1,aes(ymin=mean-qt(0.975,df=2)*SD,ymax=mean+qt(0.975,df=2)*SD),fill="red",alpha=
0.2) +geom_vline(xintercept=marine.flickx,linetype="dotted",color="gray")+geom_vline(xintercept=
marine.returnx,linetype="dotted",color="black")+geom_vline(xintercept=hermit.flickx,color="gray"
)+geom_vline(xintercept=hermit.returnx,color="black") +annotate("text", label = "Re water", x =
0.07, y = 0.045, size = 3, colour = "blue") +annotate("text", label = "Re water", x = 0.1, y =
0.015, size = 3, colour = "blue") +annotate("text", label = "Re air", x = 0.1, y = 0.070, size =
3, colour = "red") +annotate("text", label = "Re air", x = 0.1, y = 0.135, size = 3, colour = "r
ed")+theme_bw()+theme(axis.title.x=element_text(face="plain"))

p2<-ggplot(marinewaterdair,aes(time))+ylab(expression(C/(C[infinity]%.%d)~(mm^-1)))+xlab('Time
 (s)')+ylim(min(marineairdwater$mean- qt(0.975,df=2)*marineairdwater$SD),0.15)+xlim(0,hermit.ret
urnx)+geom_line(aes(y=mean),colour="darkred",lty=1)+geom_ribbon(aes(ymin=mean-qt(0.975,df=2)*SD,
ymax=mean+qt(0.975,df=2)*SD),fill="darkred",alpha=0.2) +geom_line(data=marineairdwater,aes(x=tim
e,y=mean),colour="darkblue",lty=1)+geom_ribbon(data=marineairdwater,aes(ymin=mean- qt(0.975,df=2
)*SD,ymax=mean+qt(0.975,df=2)*SD),fill="darkblue",alpha=0.2) +geom_line(data=hermitairdwater,aes
(x=time,y=mean),colour="darkblue",lty=2)+geom_ribbon(data=hermitairdwater,aes(ymin=mean-qt(0.975
,df=2)*SD,ymax=mean+qt(0.975,df=2)*SD),fill="darkblue",alpha=0.2) +geom_line(data=hermitwaterdai
r,aes(x=time,y=mean),colour="darkred",lty=2)+geom_ribbon(data=hermitwaterdair,aes(ymin=mean-qt(
0.975,df=2)*SD,ymax=mean+qt(0.975,df=2)*SD),fill="darkred",alpha=0.2) +geom_vline(xintercept=mar
ine.flickx,linetype="dotted",color="gray")+geom_vline(xintercept=marine.returnx,linetype="dotte
d",color="black")+geom_vline(xintercept=hermit.flickx,color="gray")+geom_vline(xintercept=hermi
t.returnx,color="black") +annotate("text", label = "Re air", x = 0.065, y = 0.05, size = 3, colo
ur = "darkblue") +annotate("text", label = "Re air", x = 0.1, y = 0.020, size = 3, colour = "dar
kblue") +annotate("text", label = "Re water", x = 0.1, y = 0.095, size = 3, colour = "darkred")
 +annotate("text", label = "Re water", x = 0.1, y = 0.13, size = 3, colour = "darkred")+theme_bw
()+theme(axis.title.x=element_text(face="plain"))

p3<-ggplot(marineair2,aes(time))+ylab(expression(C/(C[infinity]%.%d)~(mm^-1)))+xlab('Time (s)')+
ylim(min(hermitwater2$mean-qt(0.975,df=2)*hermitwater2$SD)-2,32)+xlim(0,hermit.returnx)+geom_lin
e(aes(y=mean),colour="red",lty=1)+geom_ribbon(aes(ymin=mean-qt(0.975,df=2)*SD,ymax=mean+qt(0.975
,df=2)*SD),fill="red",alpha=0.2) +geom_line(data=marinewater2,aes(x=time,y=mean),colour="blue",l
ty=1)+geom_ribbon(data=marinewater2,aes(ymin=mean- qt(0.975,df=2)*SD,ymax=mean+qt(0.975,df=2)*S
D),fill="blue",alpha=0.2) +geom_line(data=hermitwater2,aes(x=time,y=mean),colour="blue",lty=2)+g
eom_ribbon(data=hermitwater2,aes(ymin=mean-qt(0.975,df=2)*SD,ymax=mean+qt(0.975,df=2)*SD),fill=
"blue",alpha=0.2) +geom_line(data=hermitair2,aes(x=time,y=mean),colour="red",lty=2)+geom_ribbon
(data=hermitair2,aes(ymin=mean-qt(0.975,df=2)*SD,ymax=mean+qt(0.975,df=2)*SD),fill="red",alpha=
0.2) +geom_vline(xintercept=marine.flickx,linetype="dotted",color="gray")+geom_vline(xintercept=
marine.returnx,linetype="dotted",color="black")+geom_vline(xintercept=hermit.flickx,color="gray"
)+geom_vline(xintercept=hermit.returnx,color="black") +annotate("text", label = "T Terrestrial",
x = 0.10, y = 16, size = 3, colour = "red") +annotate("text", label = "T Marine", x = 0.1, y = 7
, size = 3, colour = "red") +annotate("text", label = "T Marine", x = 0.12, y = 3, size = 3, col
our = "blue") +annotate("text", label = "T Terrestrial", x = 0.11, y = -1.75, size = 3, colour =
"blue")+theme_bw()+theme(axis.title.x=element_text(face="plain"))

p4<-ggplot(marinewaterTswap,aes(time))+ylab(expression(C/(C[infinity]%.%d)~(mm^-1)))+xlab('Time
```

```
 (s)')+ylim(-2,32)+xlim(0,hermit.returnx)+geom_line(aes(y=mean),colour="darkblue",lty=1)+geom_ri
bbon(aes(ymin=mean-qt(0.975,df=2)*SD,ymax=mean+qt(0.975,df=2)*SD),fill="darkblue",alpha=0.2) +ge
om_line(data=marineairTswap,aes(x=time,y=mean),colour="darkred",lty=1)+geom_ribbon(data=marineai
rTswap,aes(ymin=mean- qt(0.975,df=2)*SD,ymax=mean+qt(0.975,df=2)*SD),fill="darkred",alpha=0.2) +
geom_line(data=hermitairTswap,aes(x=time,y=mean),colour="darkred",lty=2)+geom_ribbon(data=hermit
airTswap,aes(ymin=mean-qt(0.975,df=2)*SD,ymax=mean+qt(0.975,df=2)*SD),fill="darkred",alpha=0.2)
 +geom_line(data=hermitwaterTswap,aes(x=time,y=mean),colour="darkblue",lty=2)+geom_ribbon(data=h
ermitwaterTswap,aes(ymin=mean-qt(0.975,df=2)*SD,ymax=mean+qt(0.975,df=2)*SD),fill="darkblue",alp
ha=0.2) +geom_vline(xintercept=marine.flickx,linetype="dotted",color="gray")+geom_vline(xinterce
pt=marine.returnx,linetype="dotted",color="black")+geom_vline(xintercept=hermit.flickx,color="gr
ay")+geom_vline(xintercept=hermit.returnx,color="black")+annotate("text", label = "T Terrestria
l", x = 0.11, y = 21, size = 3, colour = "darkred") +annotate("text", label = "T Terrestrial", x
= 0.11, y = 11, size = 3, colour = "darkblue") +annotate("text", label = "T Marine", x = 0.12, y
= 4.5, size = 3, colour = "darkred") +annotate("text", label = "T Marine", x = 0.1, y = -1.75, s
ize = 3, colour = "darkblue")+theme_bw()+theme(axis.title.x=element_text(face="plain"))


plot_grid(p1,p2,p3,p4,labels=c("(a)","(b)","(c)","(d)"),label_size=12)##change A, B,C, D to a,
 b, c, d to get what is in the original paper
```

```
## Warning: Removed 1052 row(s) containing missing values (geom_path).
```

```
## Warning: Removed 75 row(s) containing missing values (geom_path).
```

```
## Warning: Removed 1052 row(s) containing missing values (geom_path).
```

```
## Warning: Removed 54 row(s) containing missing values (geom_path).
```
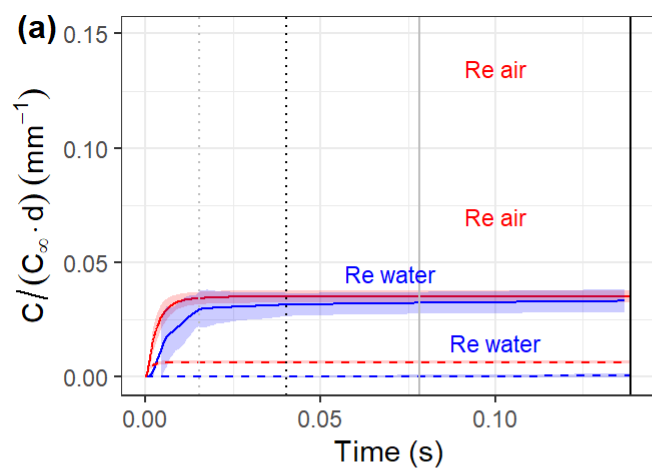
```
## Warning: Removed 1052 row(s) containing missing values (geom_path).
```

```
## Warning: Removed 75 row(s) containing missing values (geom_path).
```

```
## Warning: Removed 1 row(s) containing missing values (geom_path).
```

```
## Warning: Removed 1113 row(s) containing missing values (geom_path).
```

```
## Warning: Removed 352 row(s) containing missing values (geom_path).
```

(a)

(b)

(c)

(d)
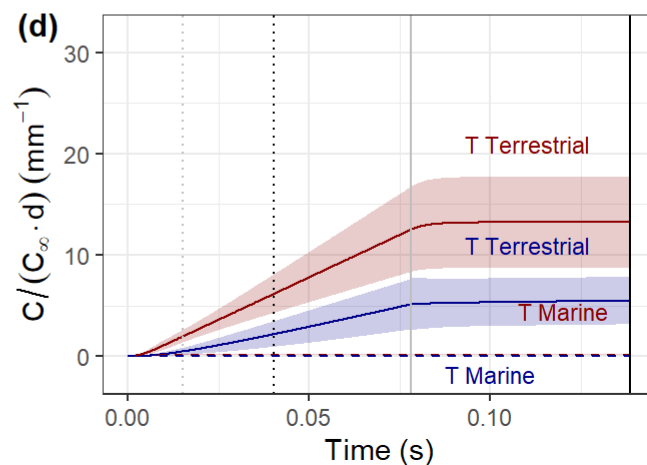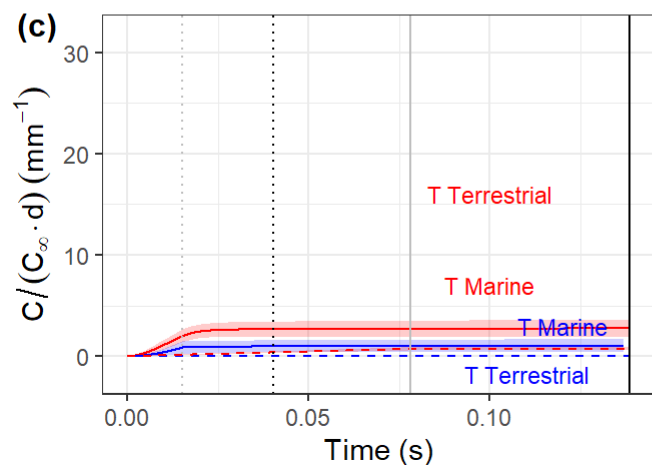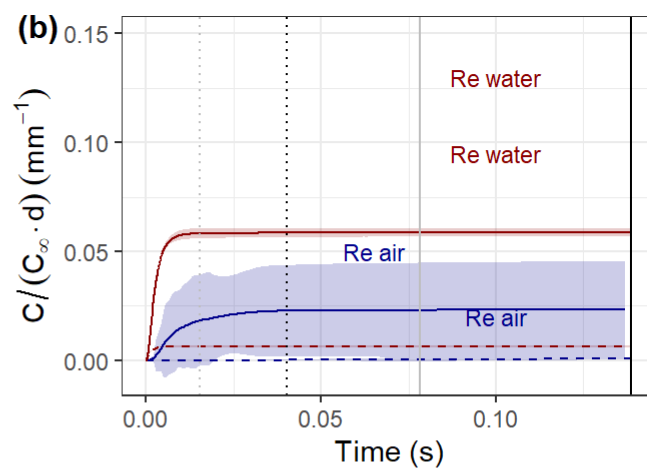
library(knitr) library(markdown) library(rmarkdown)

d=read.table(file="myfile.txt",header=TRUE,sep="") d

render("markdown", "pdf_document")