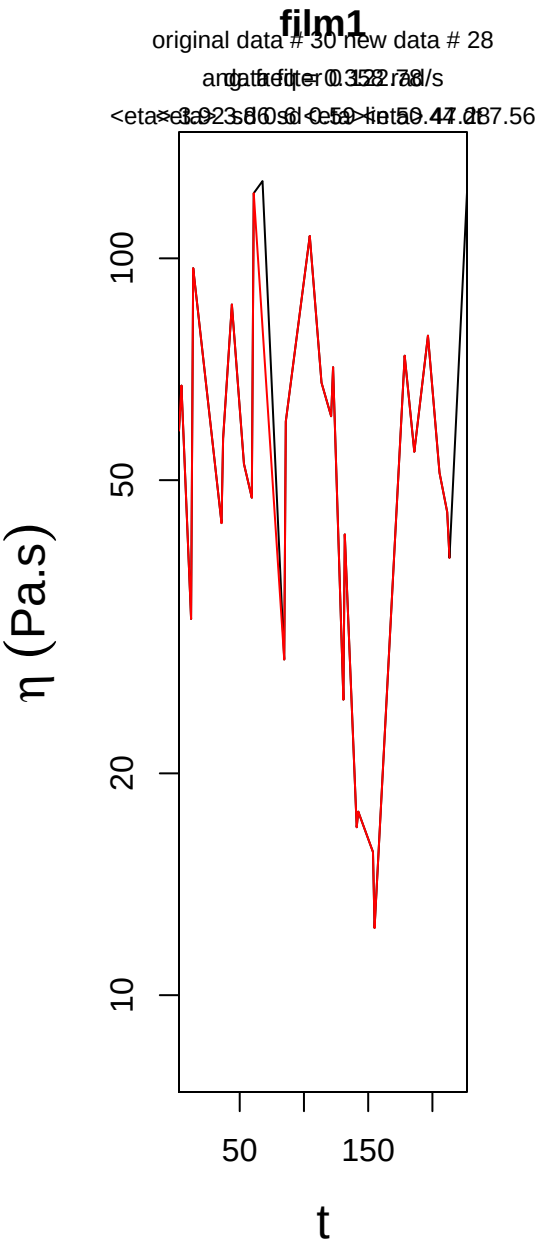
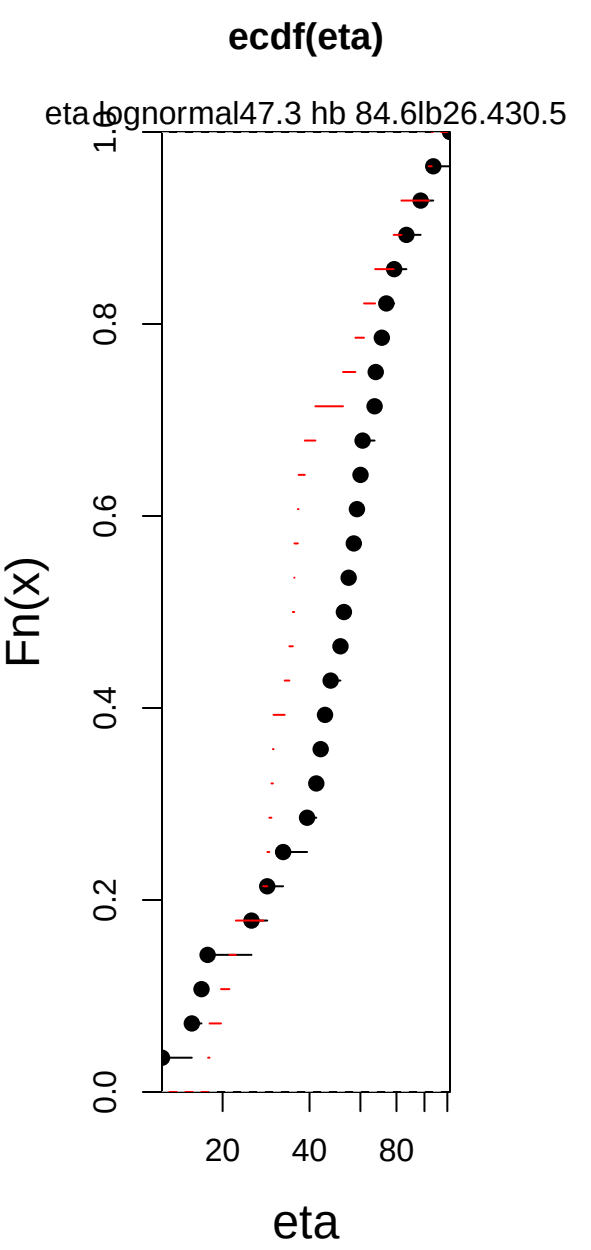
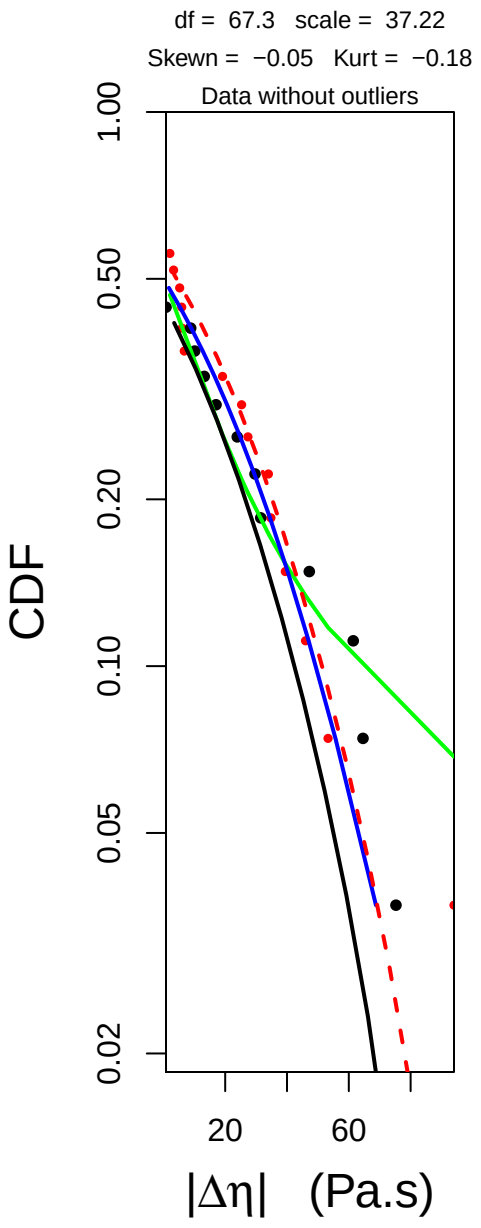
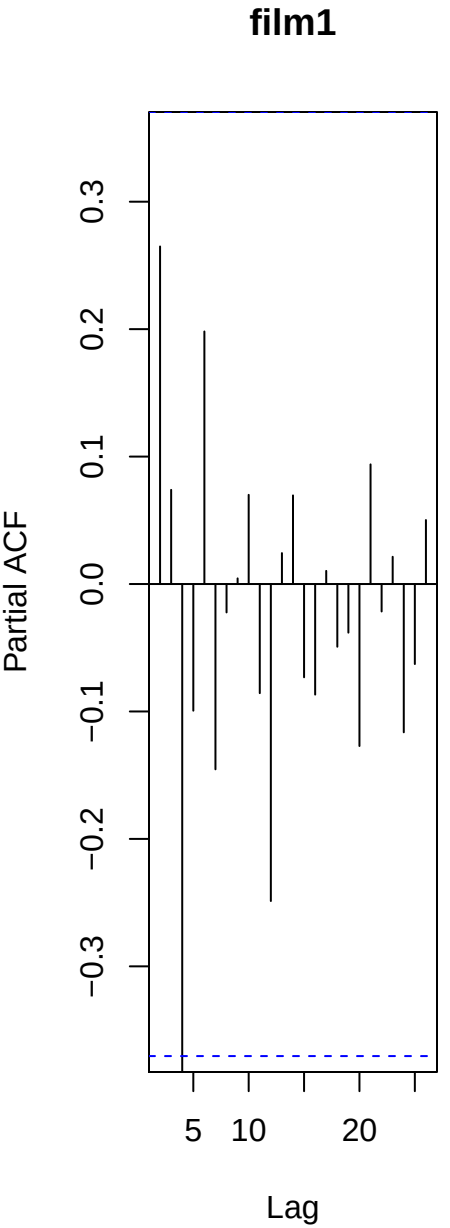
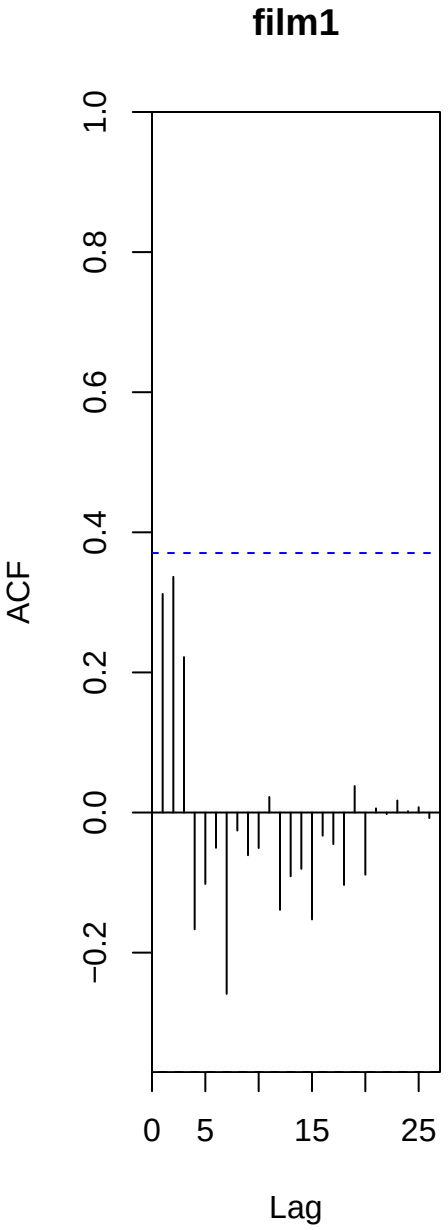
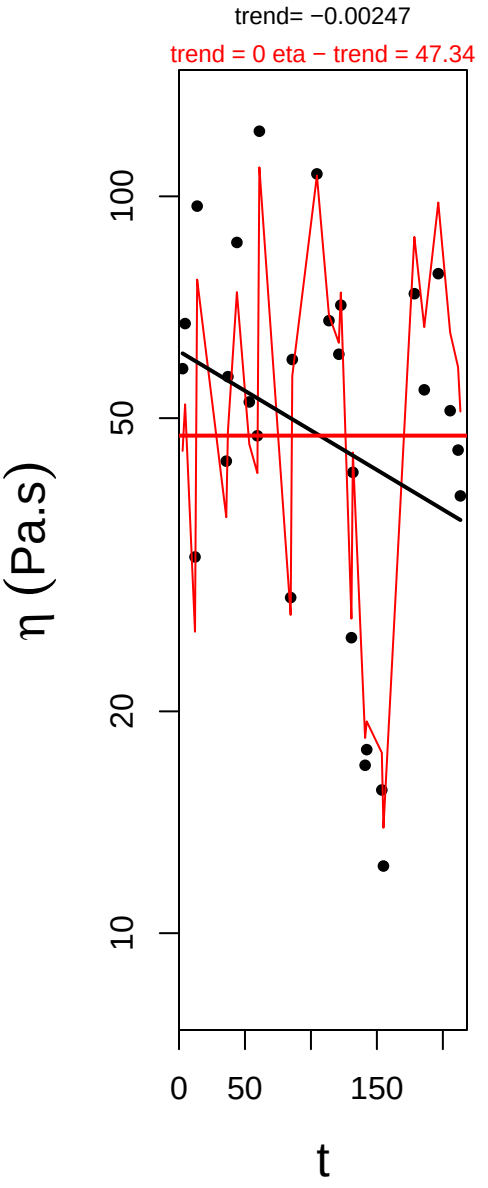

film1
original data # 30 new data # 28
<eta<47.56
η (Pa.s)
100
50
20
10
50
150
t

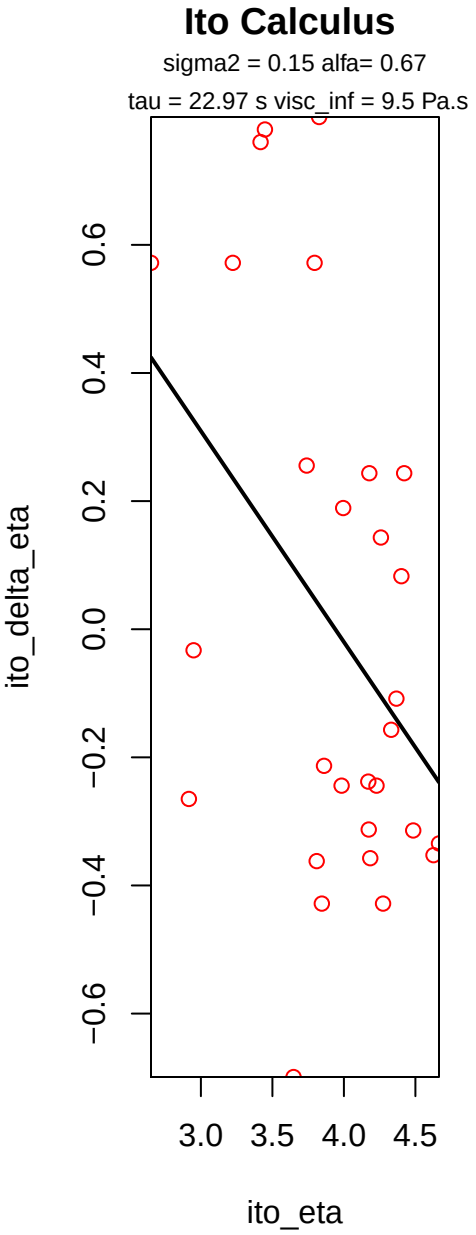

ecdf(eta)
eta lognormal47.3 hb 84.6lb26.430.5
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
20
40
80
eta

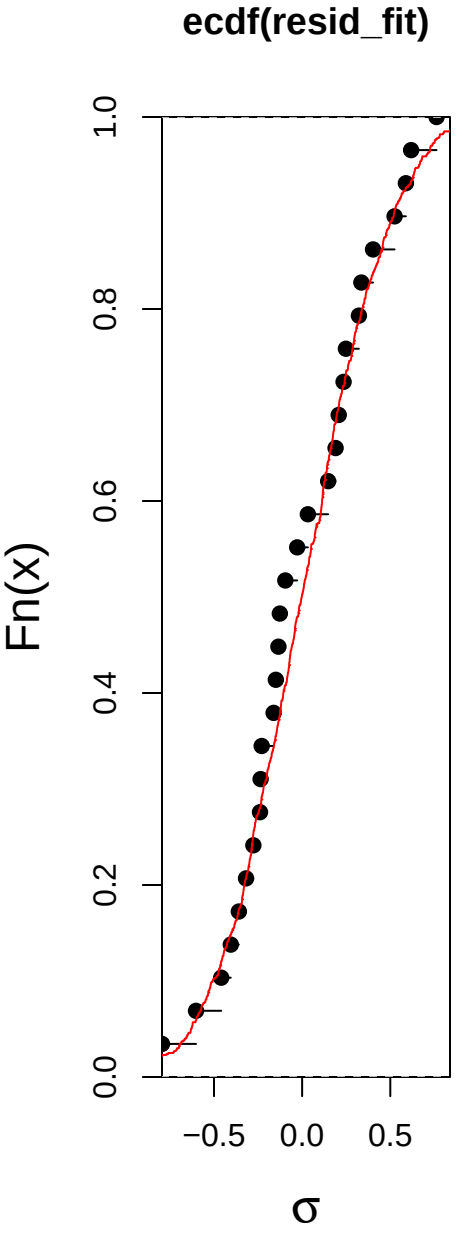

df = 67.3 scale = 37.22
Skewn = −0.05 Kurt = −0.18
Data without outliers
CDF
1.00
0.50
0.20
0.10
0.05
0.02
20
60
|Δη| (Pa.s)

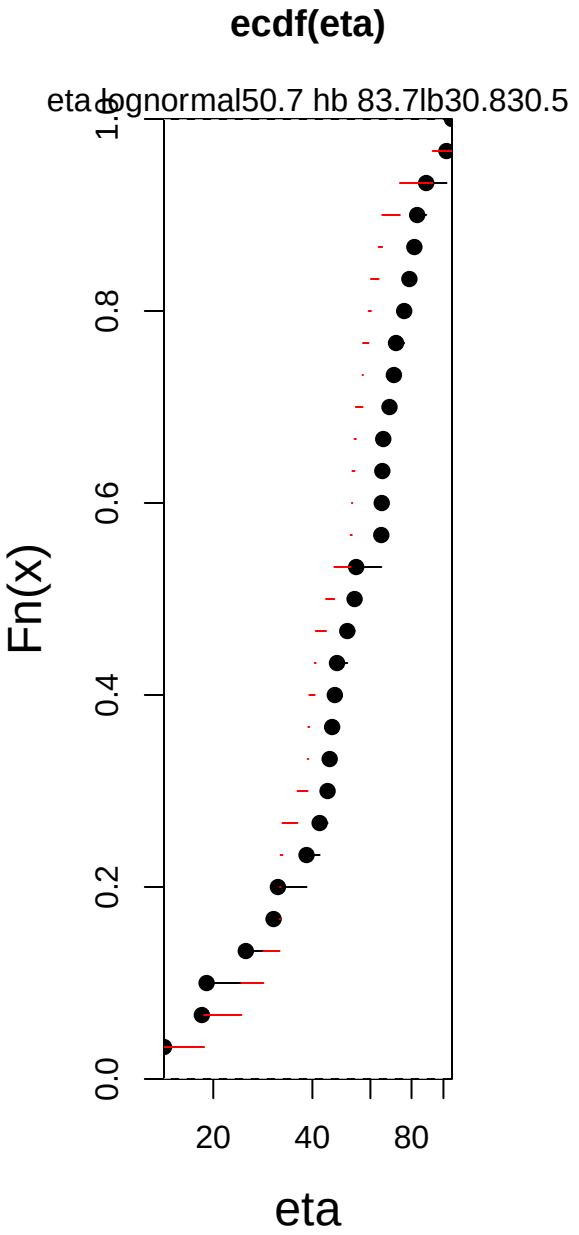

film1
Partial ACF
0.3
0.2
0.1
0.0
−0.1
−0.2
−0.3
5
10
20
Lag

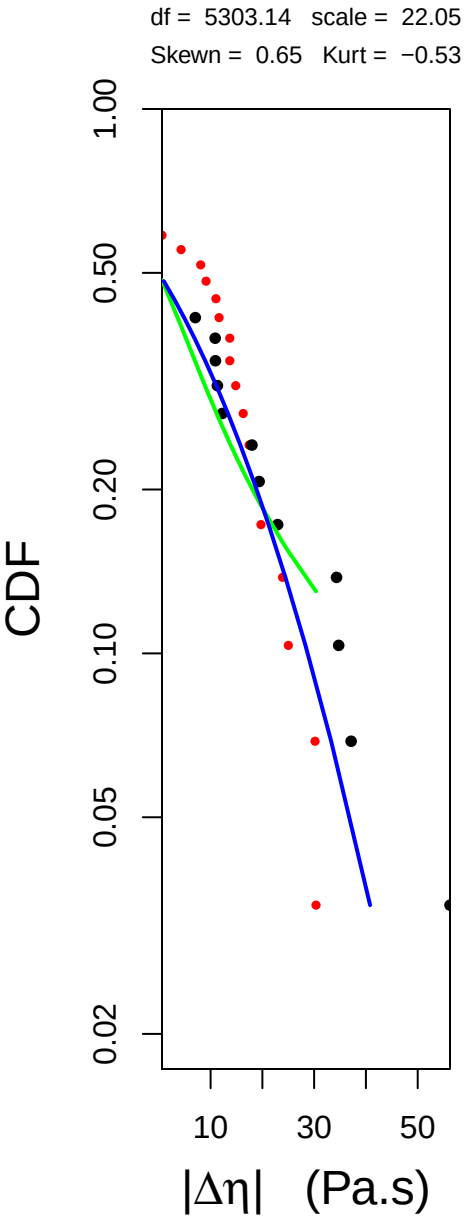

film1
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
5
15
25
Lag


trend= −0.00247
trend = 0 eta − trend = 47.34
η (Pa.s)
100
50
20
10
0
50
150
t

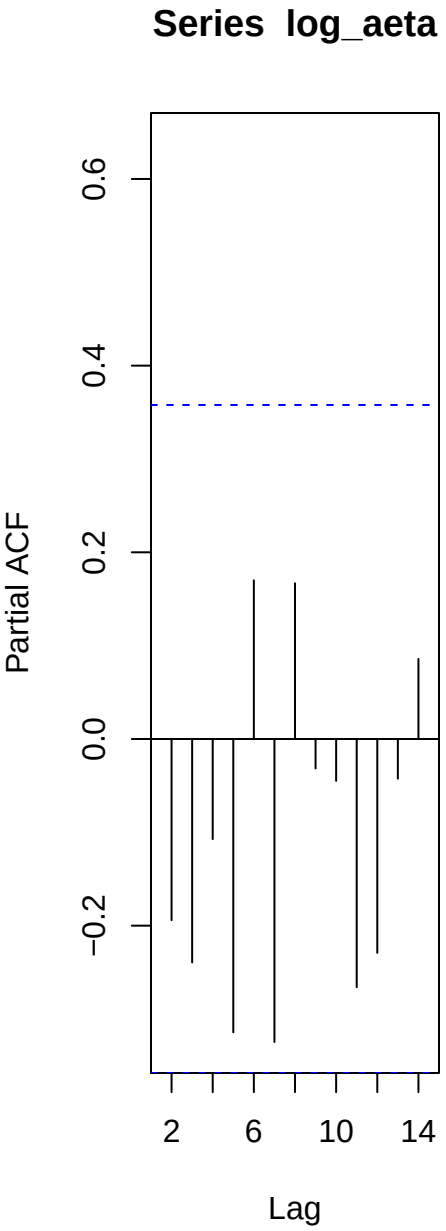

Ito Calculus
sigma2 = 0.15 alfa= 0.67
tau = 22.97 s visc_inf = 9.5 Pa.s
ito_delta_eta
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
3.0
3.5
4.0
4.5
ito_eta

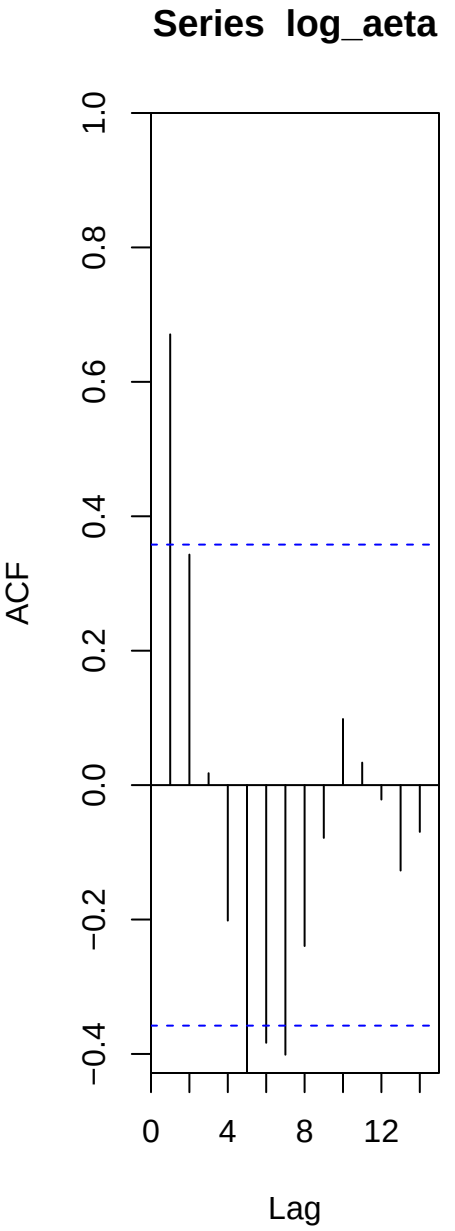

ecdf(resid_fit)
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
−0.5
0.0
0.5
σ

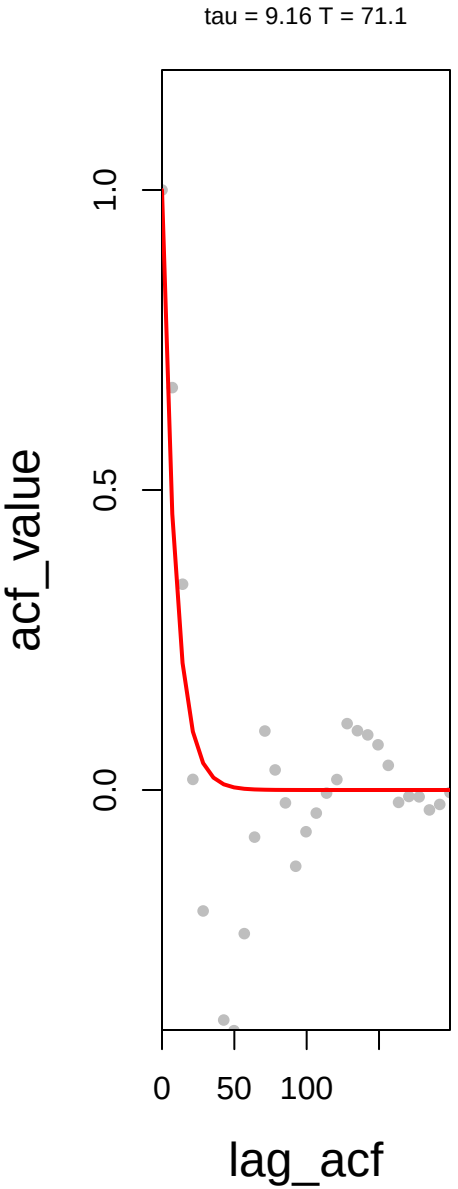


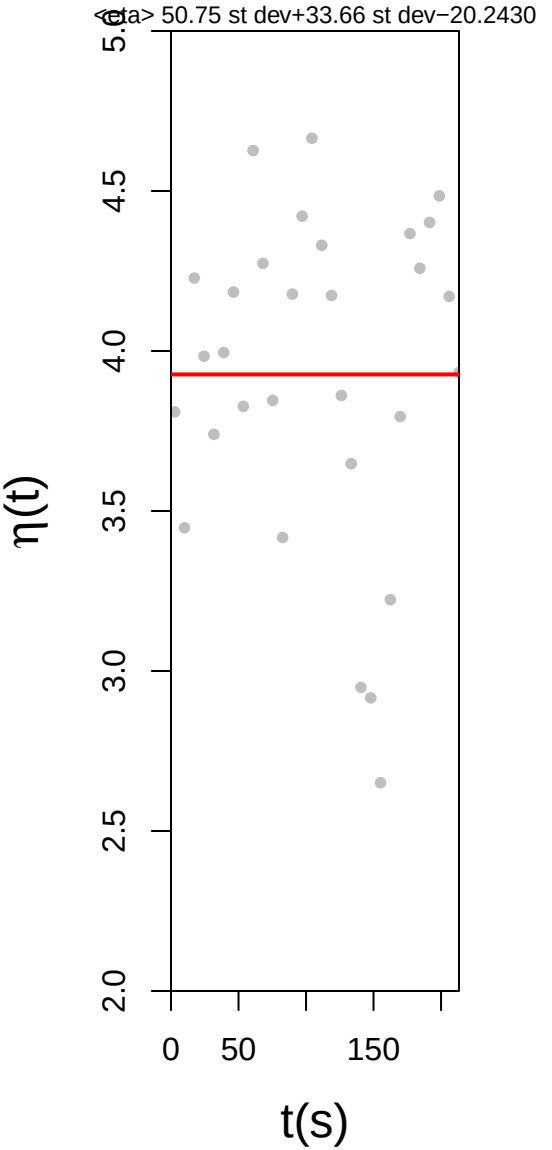


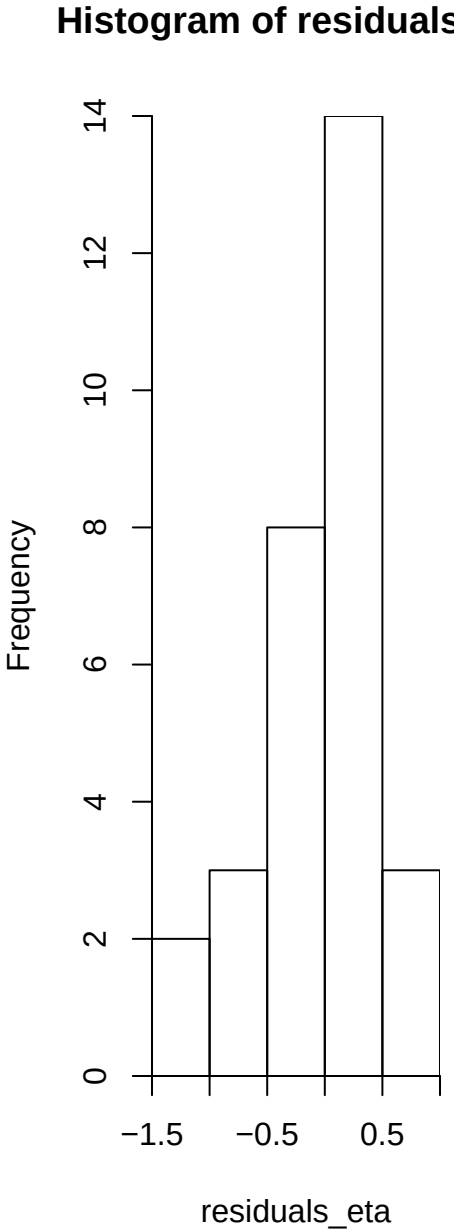
riginal data #

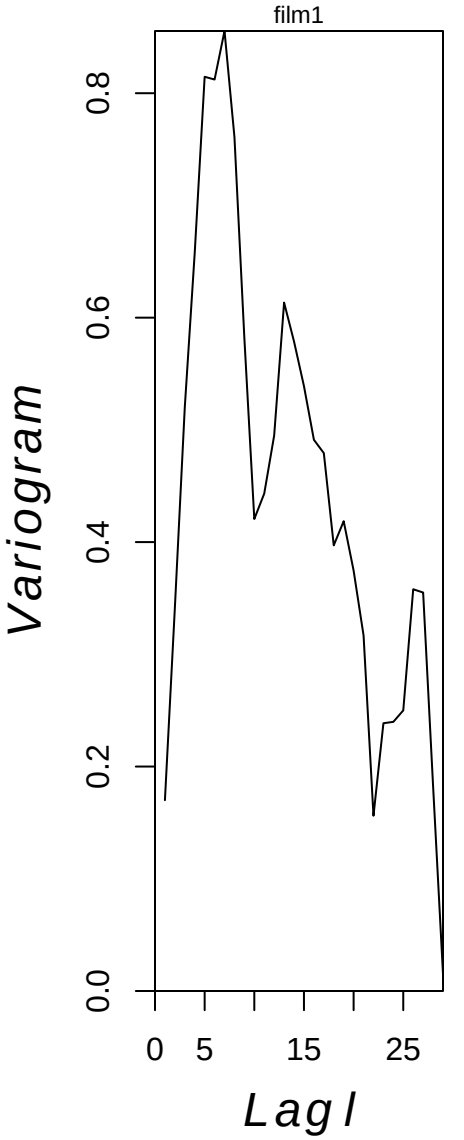

Series log_aeta
Partial ACF
0.6
0.4
0.2
0.0
−0.2
2
6
10
14
Lag

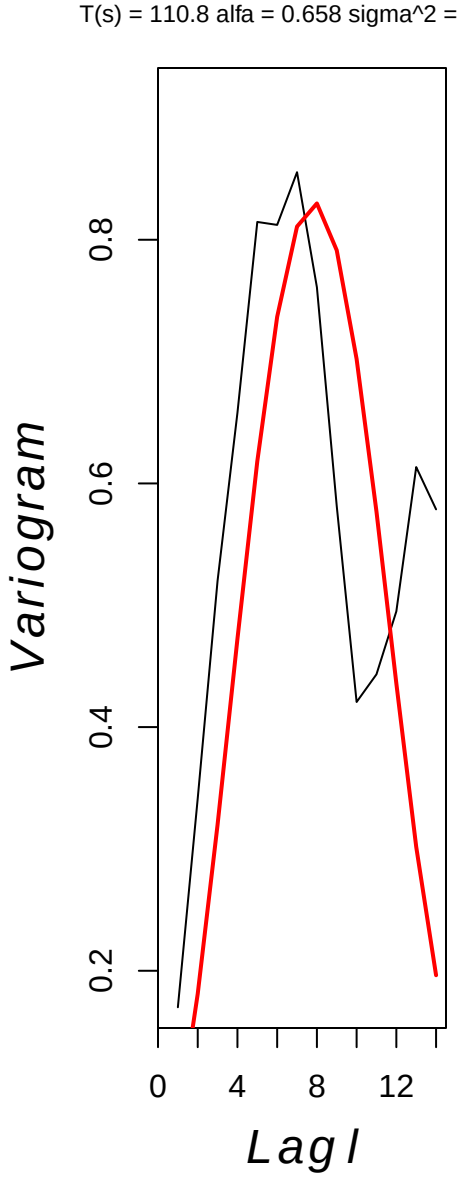

Series log_aeta
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
0
4
8
12
Lag

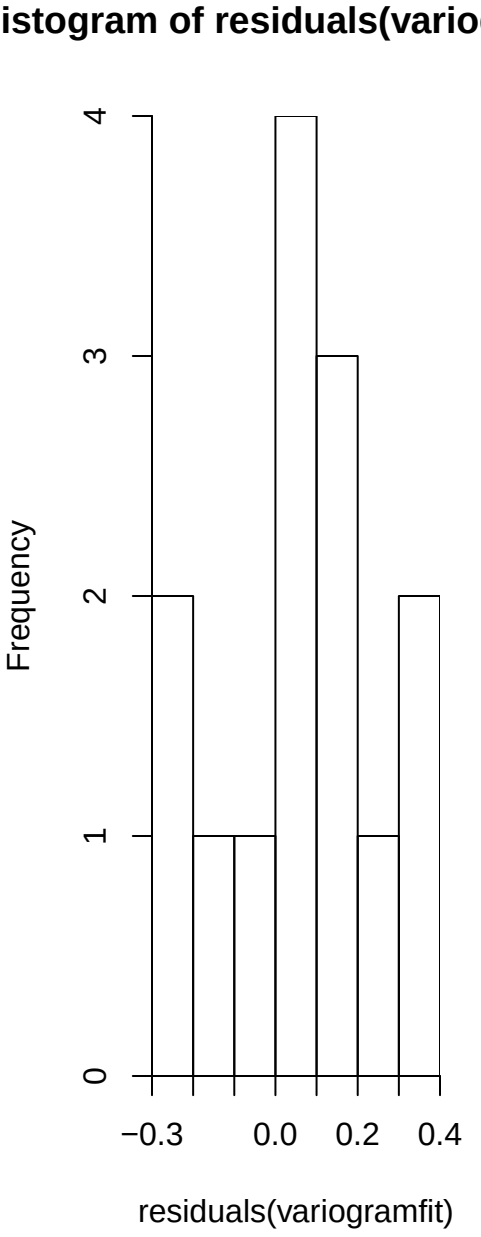

tau = 9.16 T = 71.1
acf_value
0.0
0.5
1.0
0
50
100
lag_acf

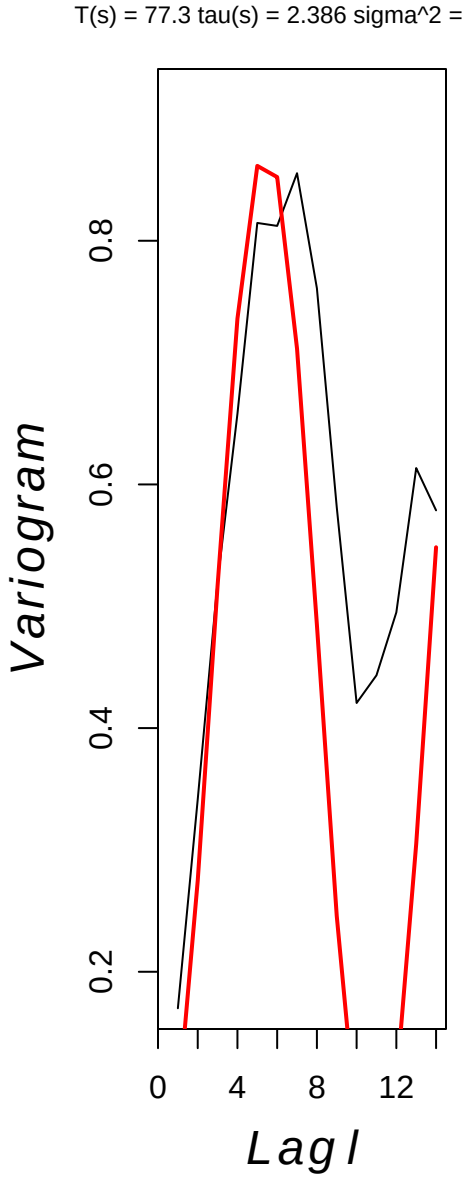

<eta> 50.75 st dev+33.66 st dev−20.2430
η(t)
2.0
2.5
3.0
3.5
4.0
4.5
5.0
0
50
150
t(s)

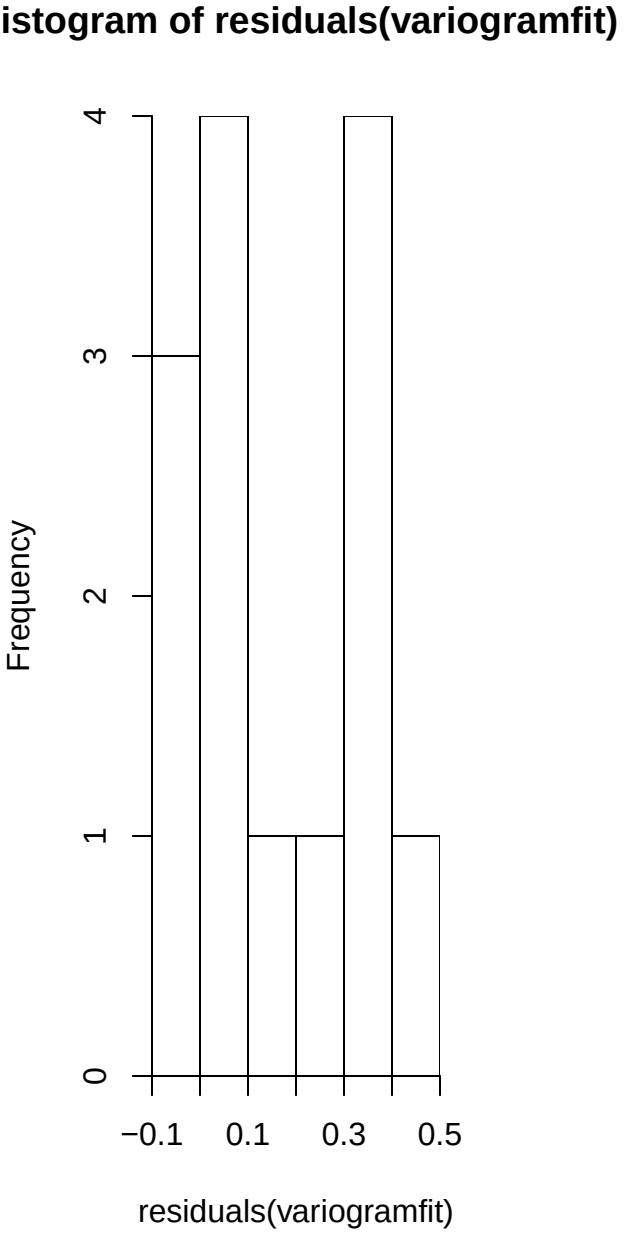

Histogram of residuals_eta
Frequency
0
2
4
6
8
10
12
14
−1.5
−0.5
0.5
residuals_eta

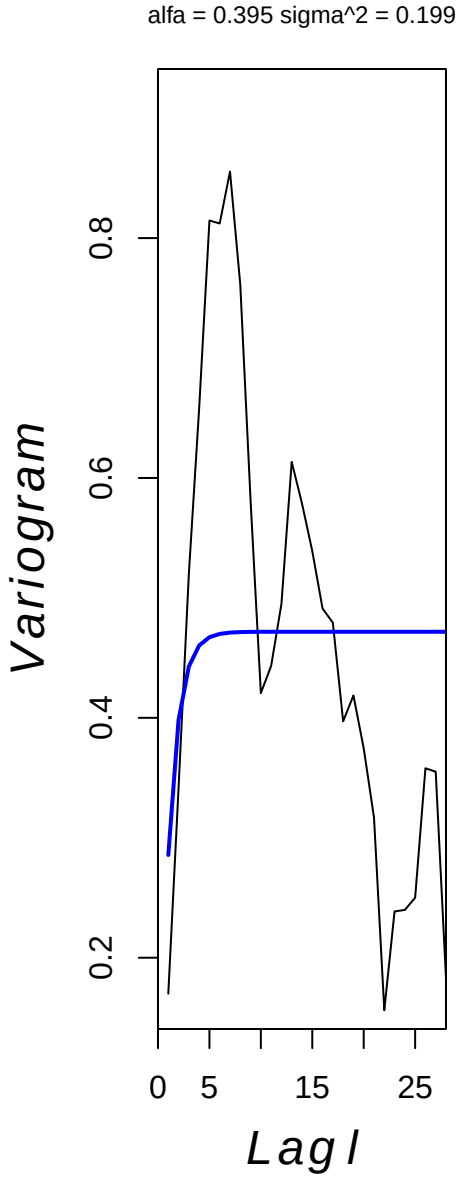

film1
Variogram
0.0
0.2
0.4
0.6
0.8
0
5
15
25
Lag l

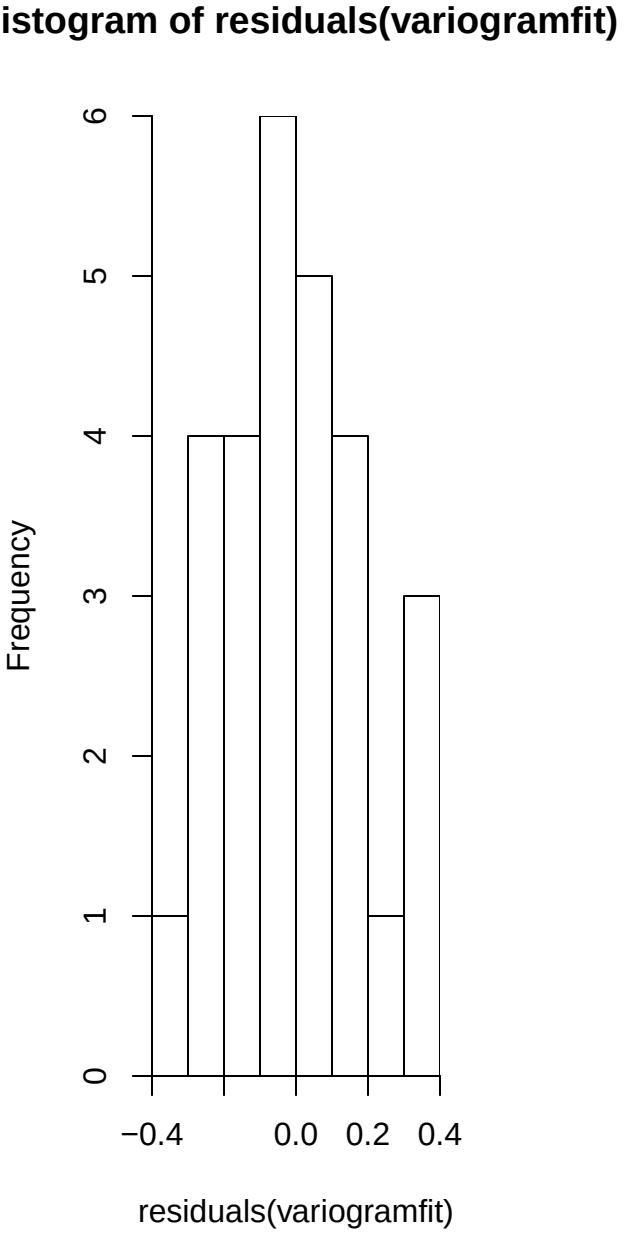

T(s) = 110.8 alfa = 0.658 sigma^2 = 0.036
Variogram
0.2
0.4
0.6
0.8
0
4
8
12
Lag l

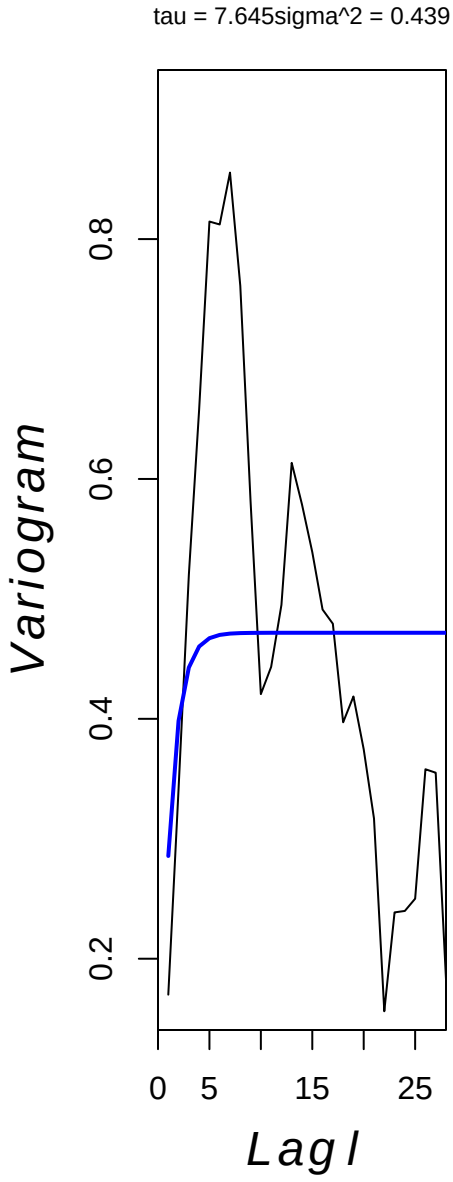

Histogram of residuals(variogramfit)
Frequency
0
1
2
3
4
−0.3
0.0
0.2
0.4
residuals(variogramfit)

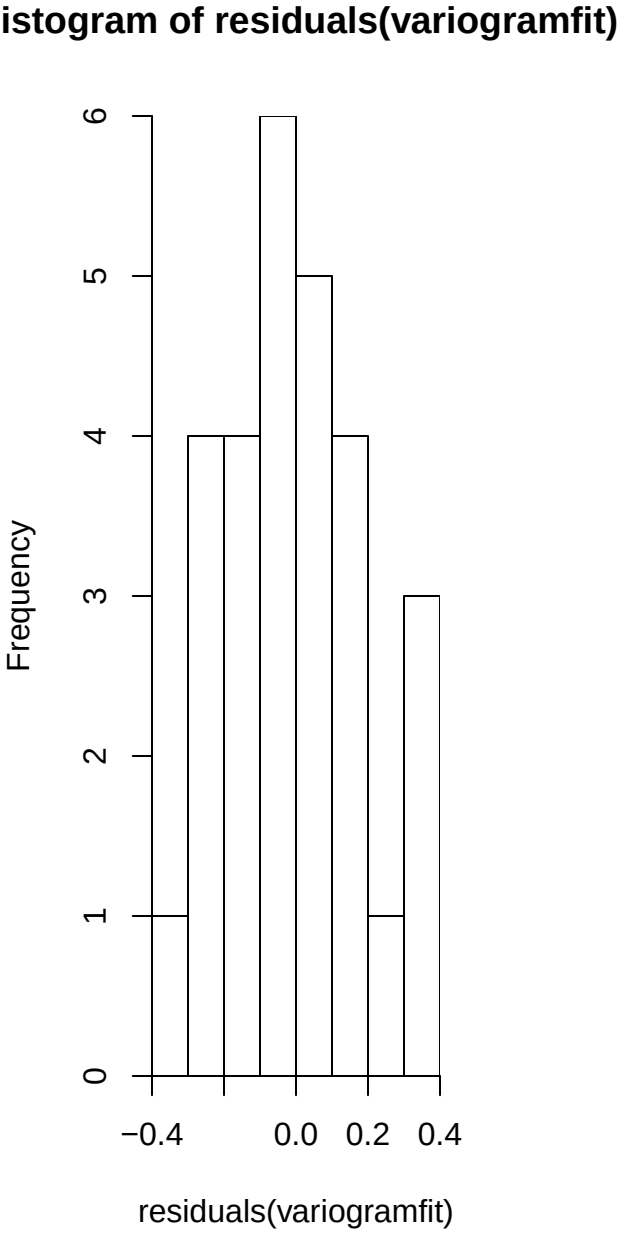

T(s) = 77.3 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.2
0.4
0.6
0.8
0
4
8
12
Lag l

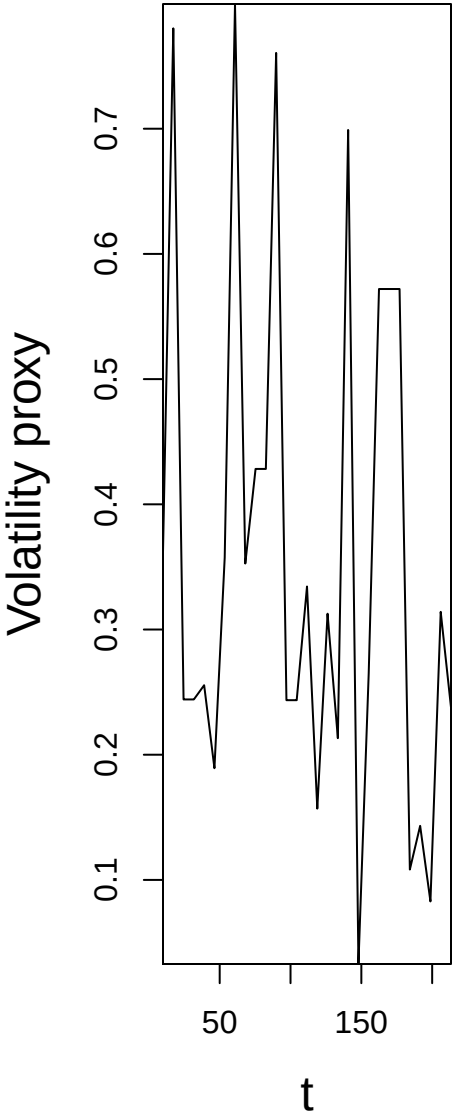

Histogram of residuals(variogramfit)
Frequency
0
1
2
3
4
−0.1
0.1
0.3
0.5
residuals(variogramfit)

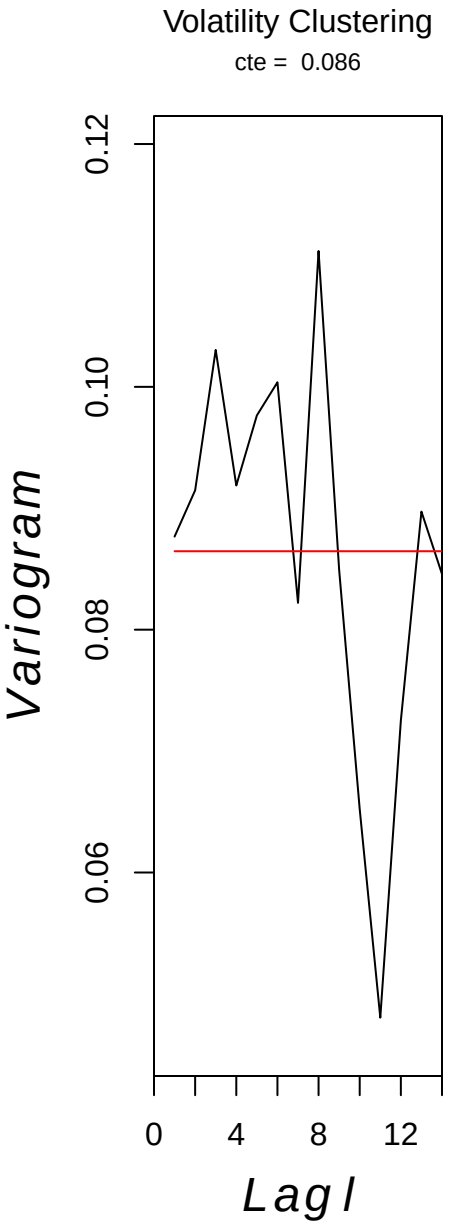

alfa = 0.395 sigma^2 = 0.199
Variogram
0.2
0.4
0.6
0.8
0
5
15
25
Lag l

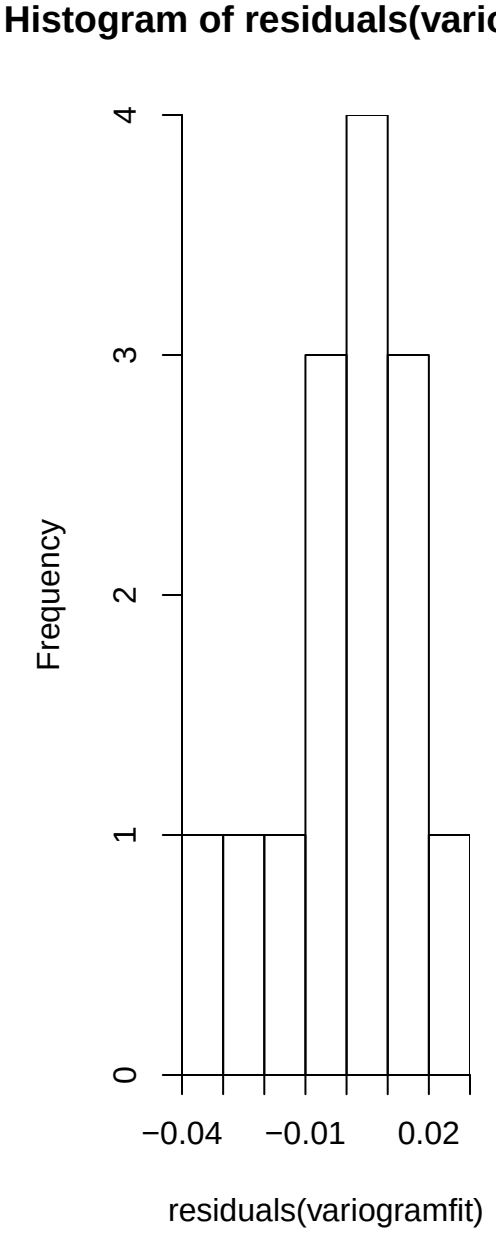

Histogram of residuals(variogramfit)
Frequency
0
1
2
3
4
5
6
−0.4
0.0
0.2
0.4
residuals(variogramfit)

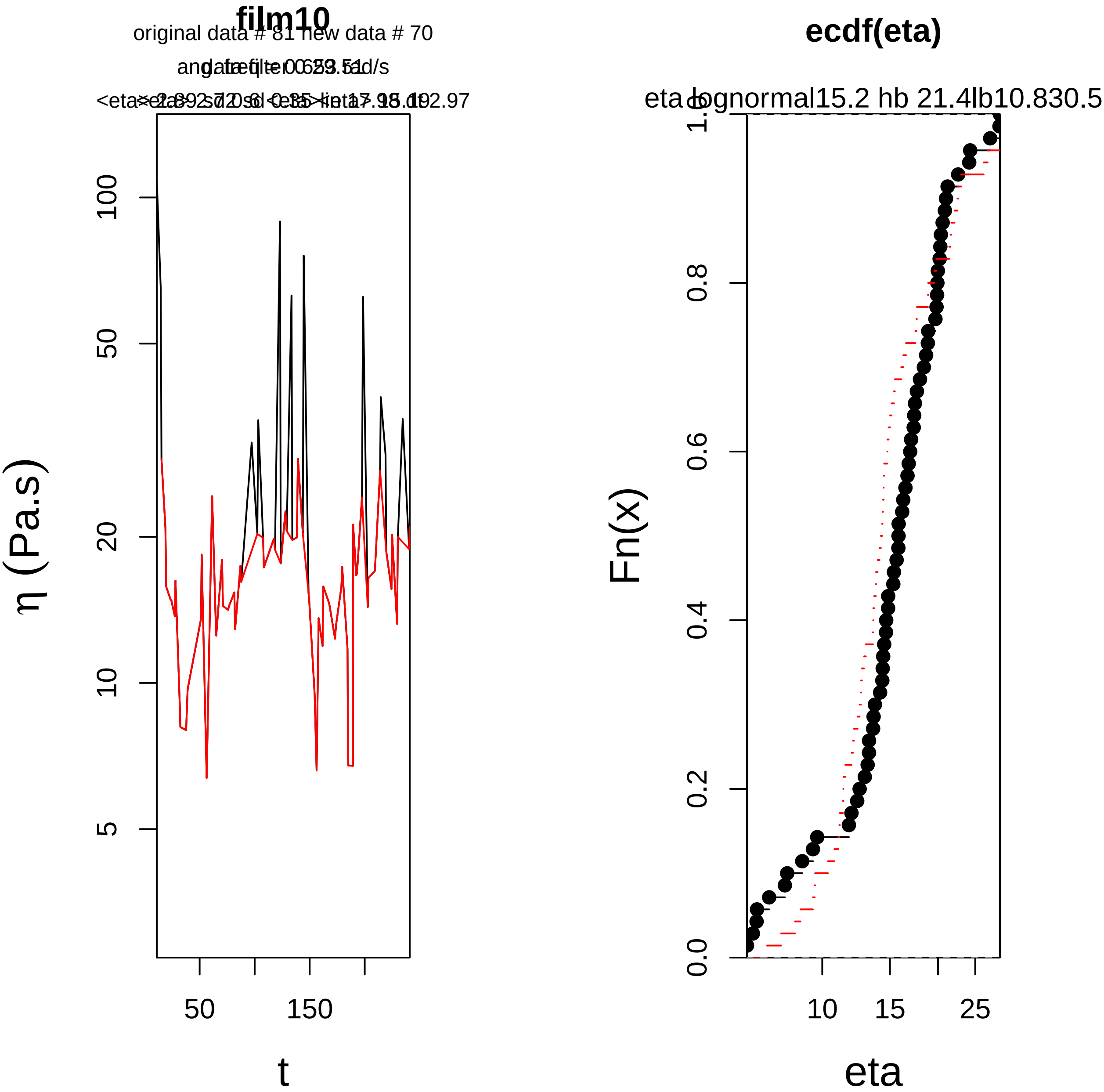

tau = 7.645sigma^2 = 0.439
Variogram
0.2
0.4
0.6
0.8
0
5
15
25
Lag l


Histogram of residuals(variogramfit)
Frequency
0
1
2
3
4
5
6
−0.4
0.0
0.2
0.4
residuals(variogramfit)

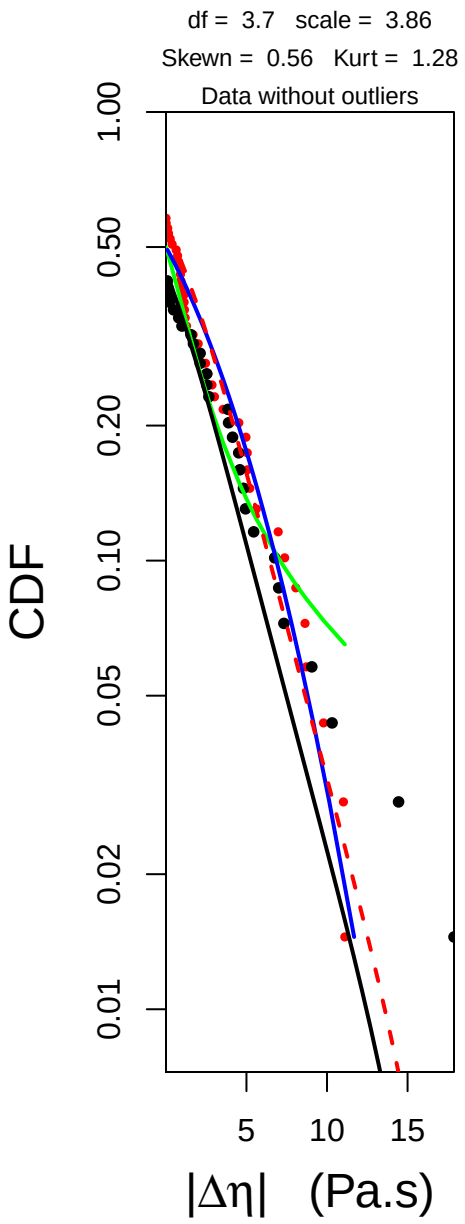

Volatility proxy
0.1
0.2
0.3
0.4
0.5
0.6
0.7
50
150
t

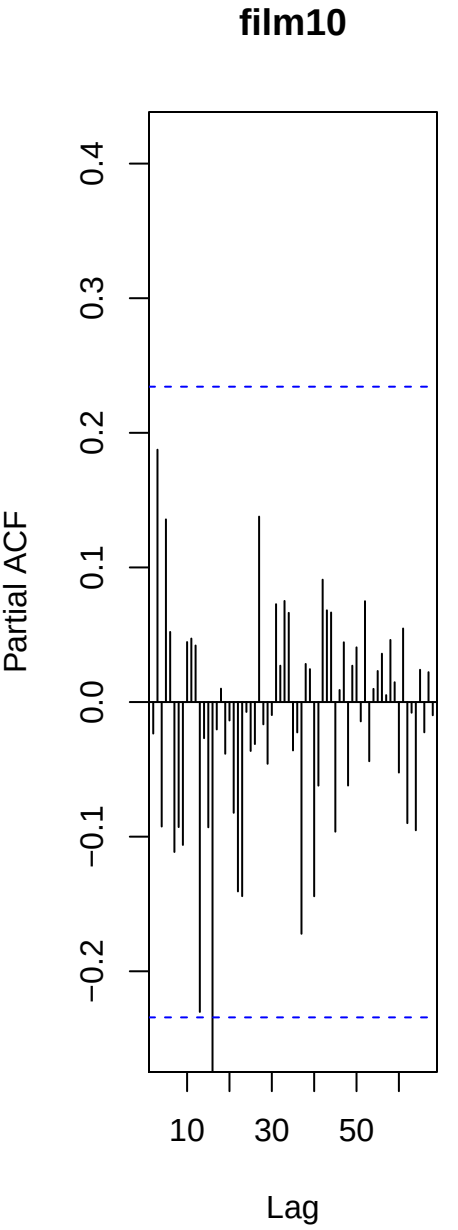

Volatility Clustering
cte = 0.086
Variogram
0.06
0.08
0.10
0.12
0
4
8
12
Lag l

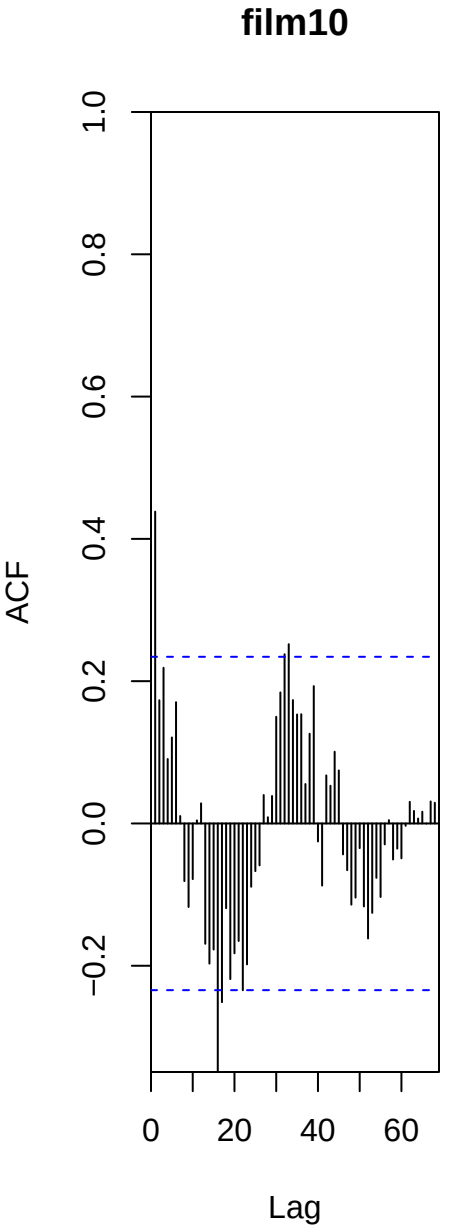

Histogram of residuals(variogramfit)
Frequency
0
1
2
3
4
−0.04
−0.01
0.02
residuals(variogramfit)

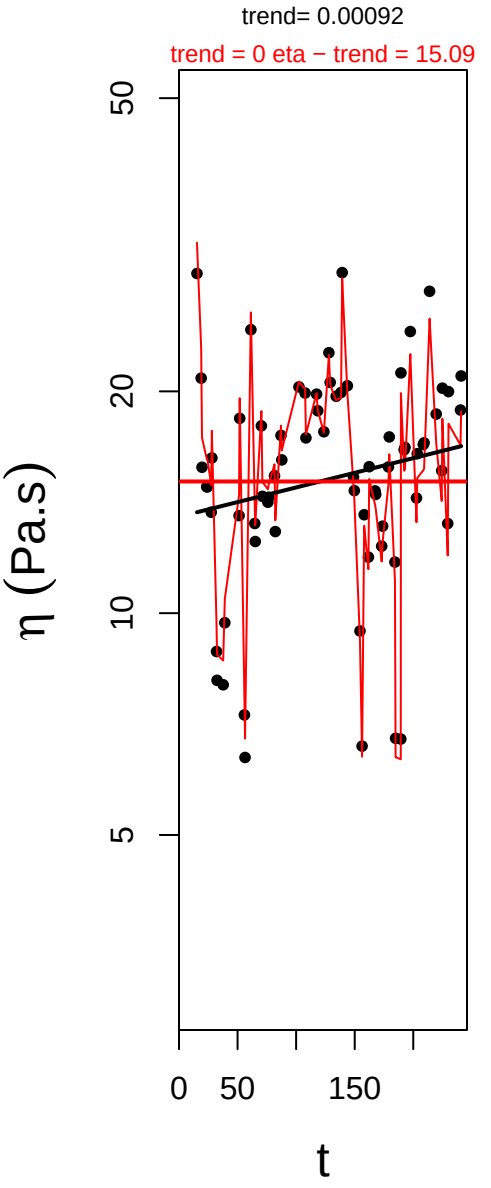


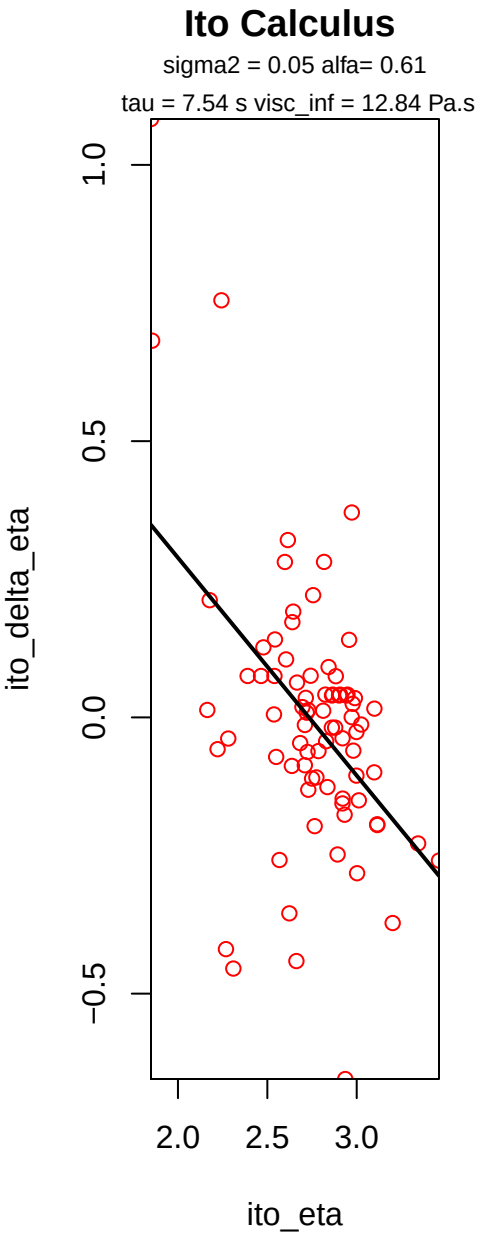
film10
original data # 81 new data # 70
ecdf(eta)
eta lognormal15.2 hb 21.4lb10.830.5
η (Pa.s)
100
50
20
10
5
50
150
t
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
10
15
25
eta

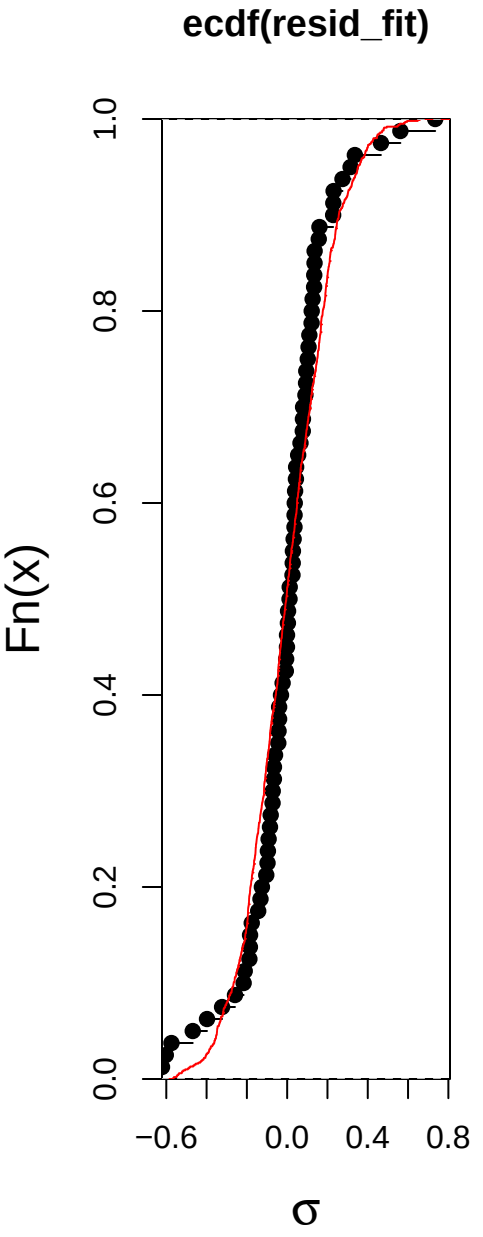

df = 3.7 scale = 3.86
Skewn = 0.56 Kurt = 1.28
Data without outliers
CDF
1.00
0.50
0.20
0.10
0.05
0.02
0.01
5
10
15
|Δη| (Pa.s)

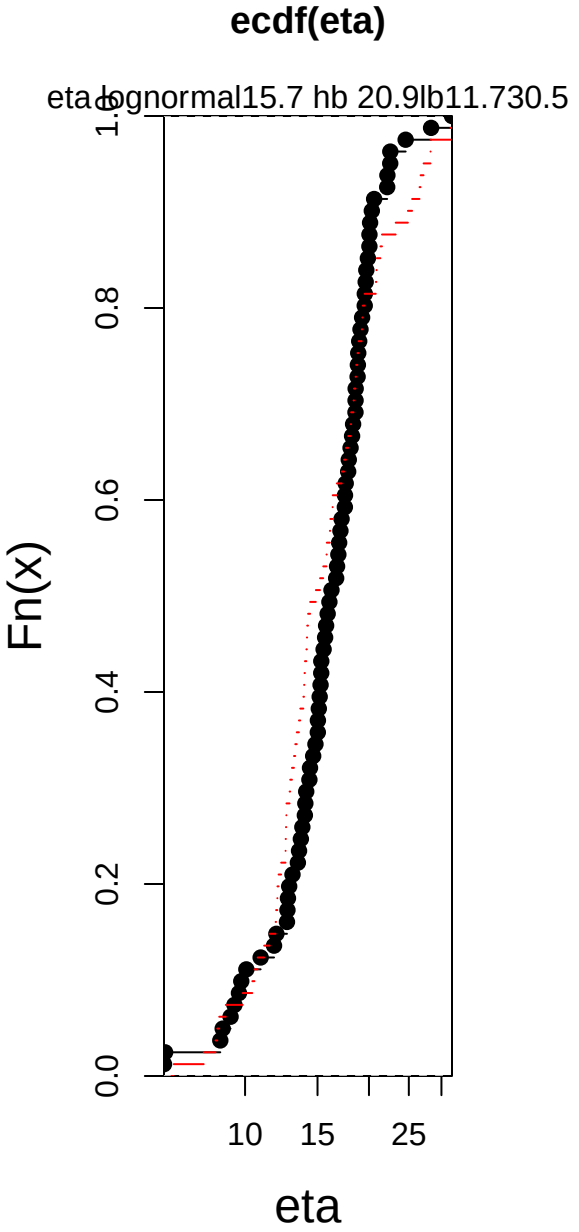

film10
Partial ACF
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
10
30
50
Lag

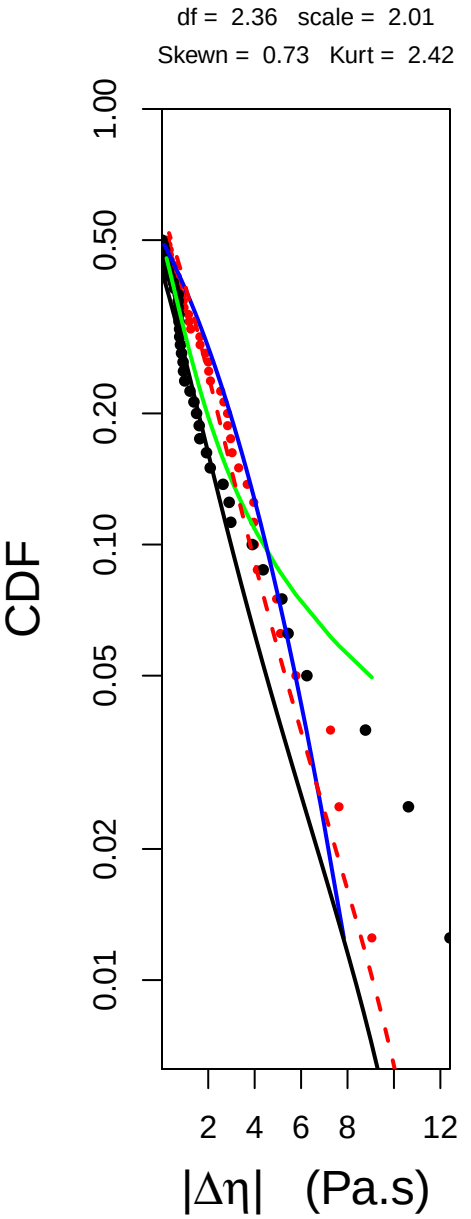

film10
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
20
40
60
Lag


trend= 0.00092
trend = 0 eta − trend = 15.09
η (Pa.s)
50
20
10
5
0
50
150
t

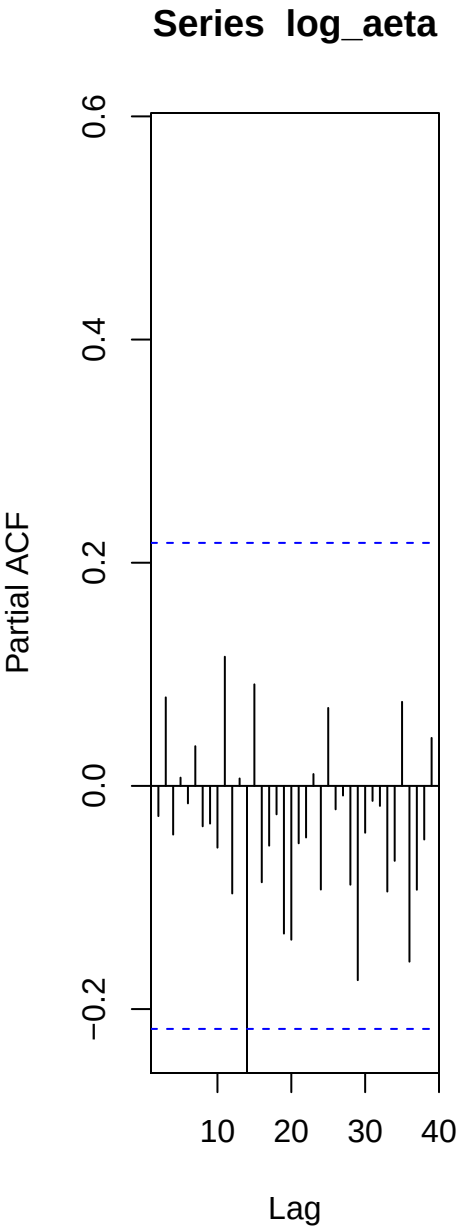

Ito Calculus
sigma2 = 0.05 alfa= 0.61
tau = 7.54 s visc_inf = 12.84 Pa.s
ito_delta_eta
1.0
0.5
0.0
−0.5
2.0
2.5
3.0
ito_eta

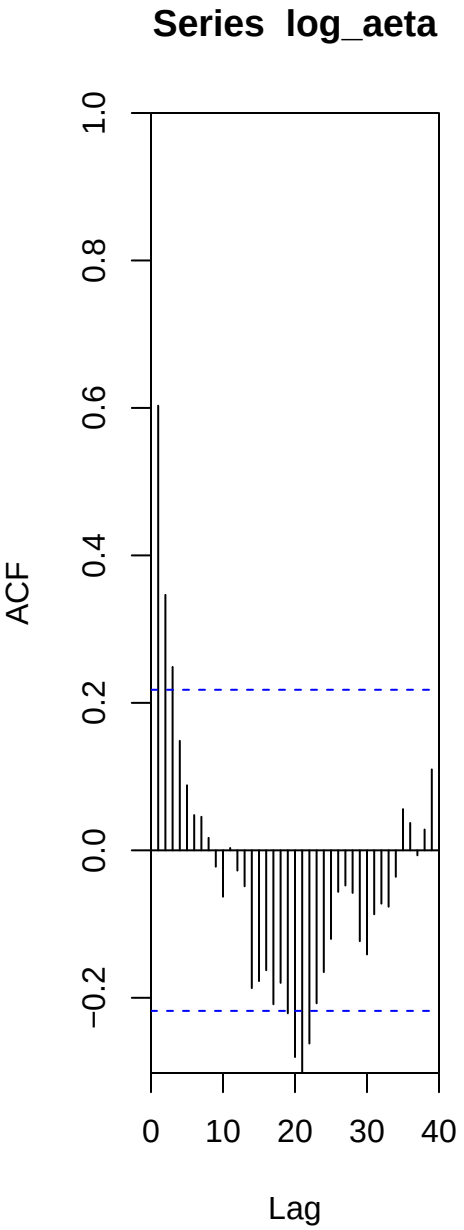

ecdf(resid_fit)
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
−0.6
0.0
0.4
0.8
σ

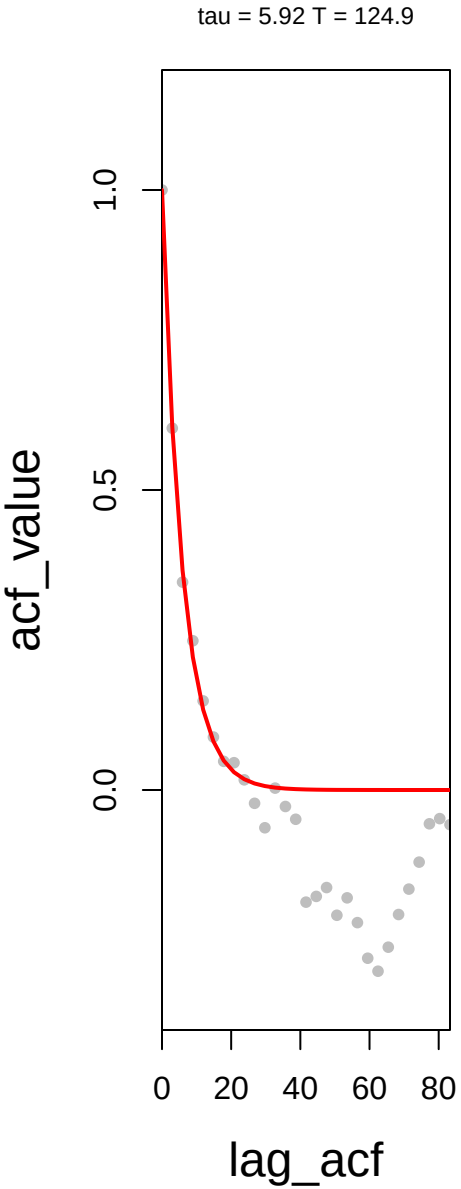


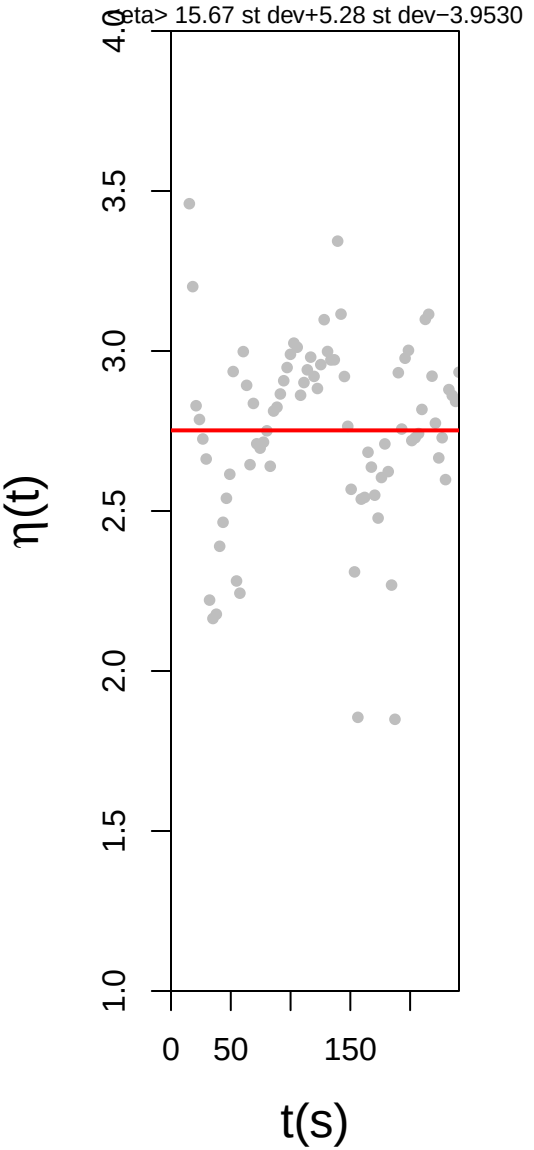


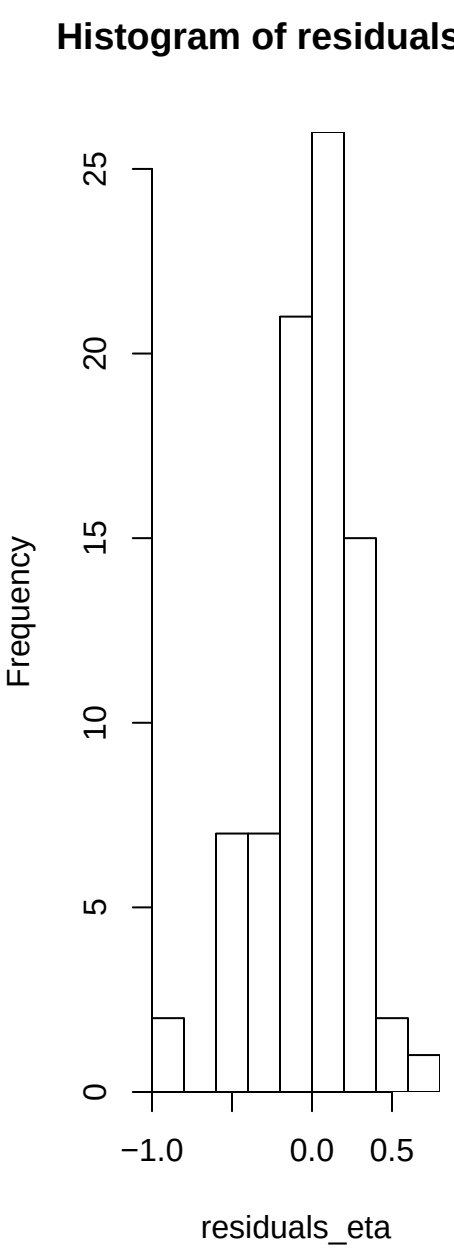
riginal data #

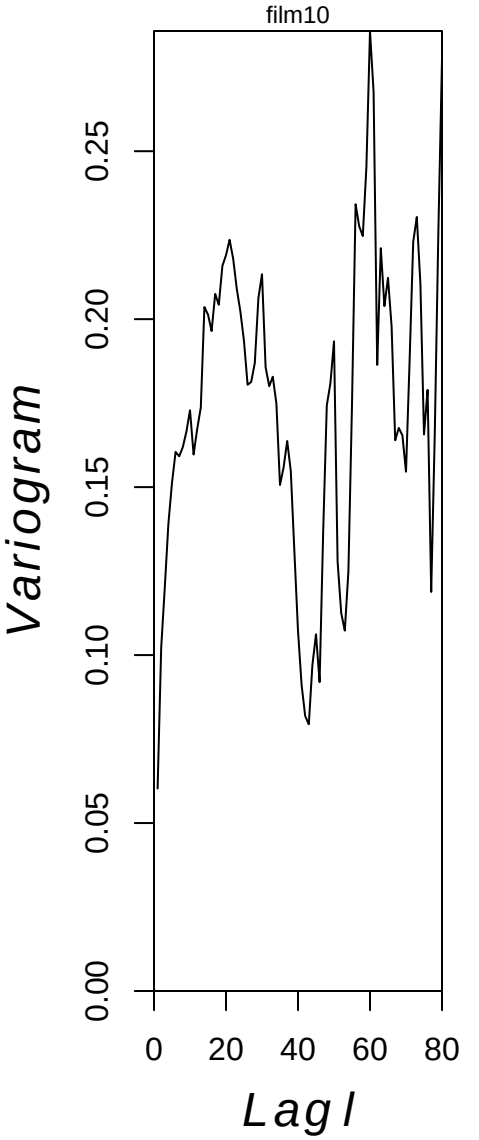

Series log_aeta
Partial ACF
0.6
0.4
0.2
0.0
−0.2
10
20
30
40
Lag

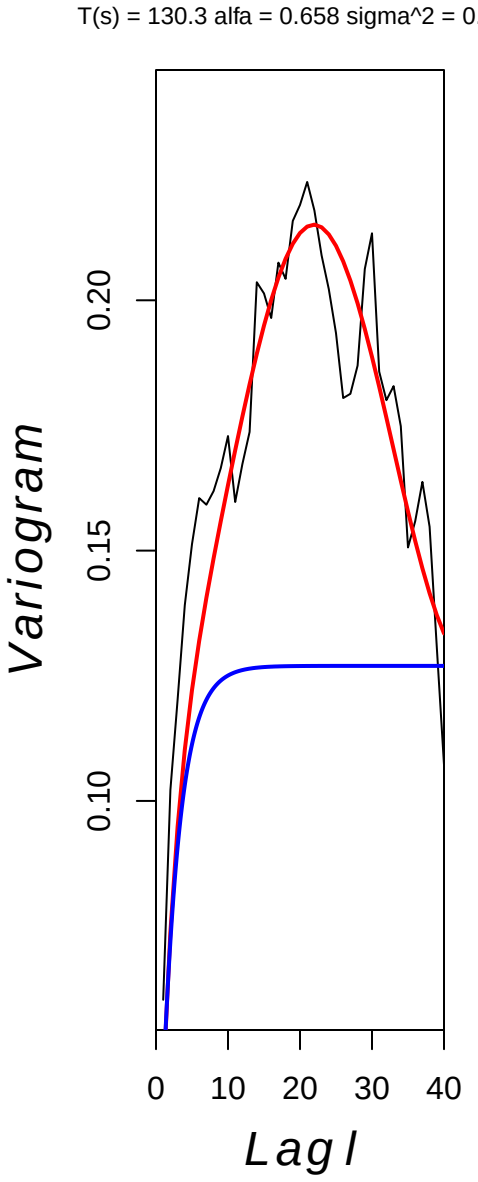

Series log_aeta
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
10
20
30
40
Lag

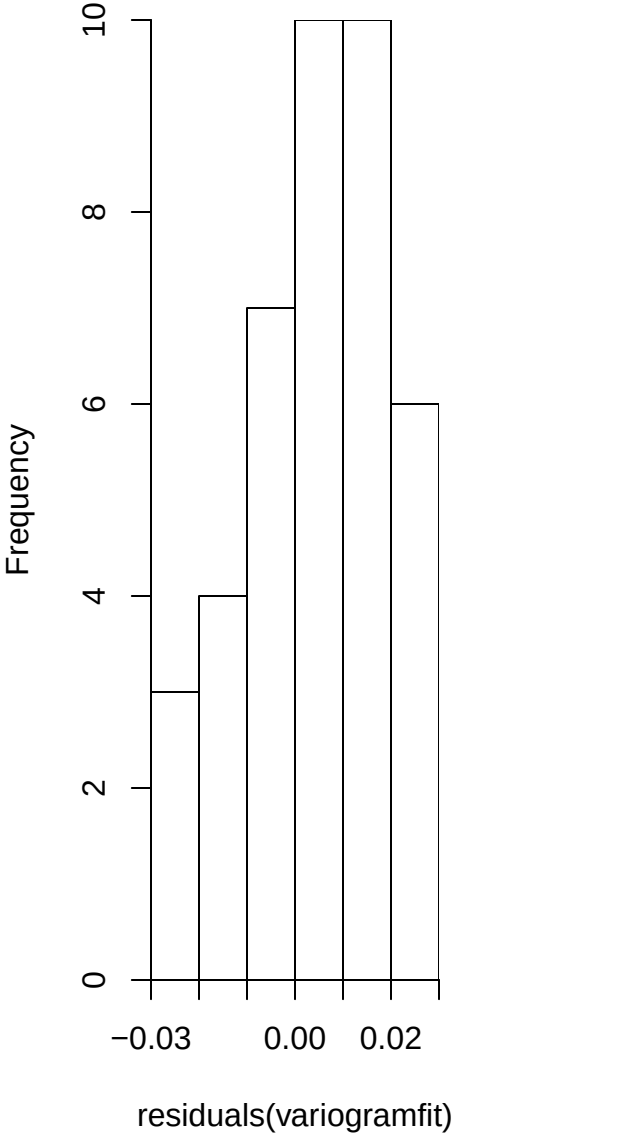

tau = 5.92 T = 124.9
acf_value
0.0
0.5
1.0
0
20
40
60
80
lag_acf

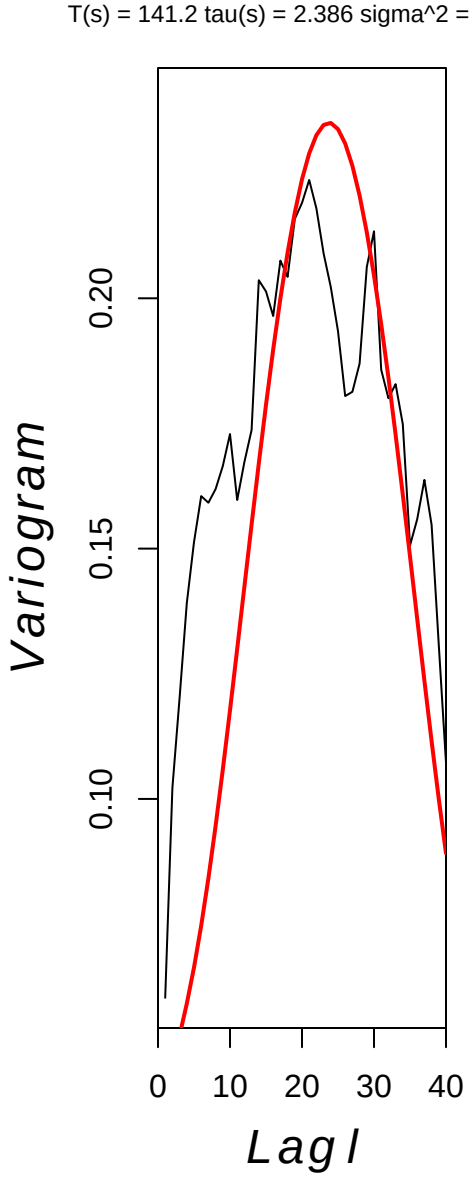

eta> 15.67 st dev+5.28 st dev−3.9530
η(t)
1.0
1.5
2.0
2.5
3.0
3.5
4.0
0
50
150
t(s)

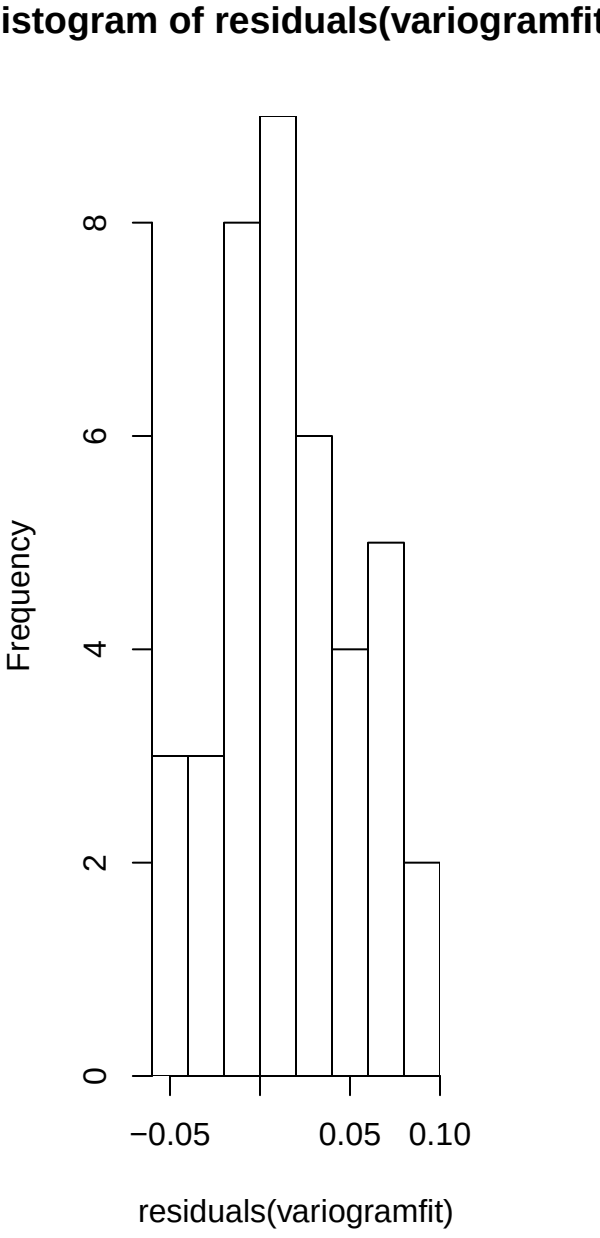

Histogram of residuals_eta
Frequency
0
5
10
15
20
25
−1.0
0.0
0.5
residuals_eta

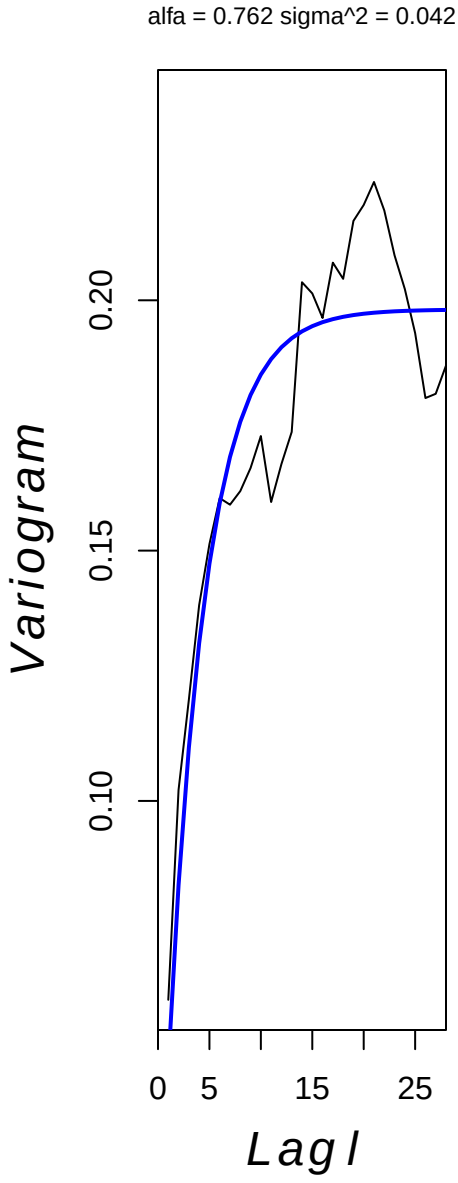

film10
Variogram
0.00
0.05
0.10
0.15
0.20
0.25
0
20
40
60
80
Lag l

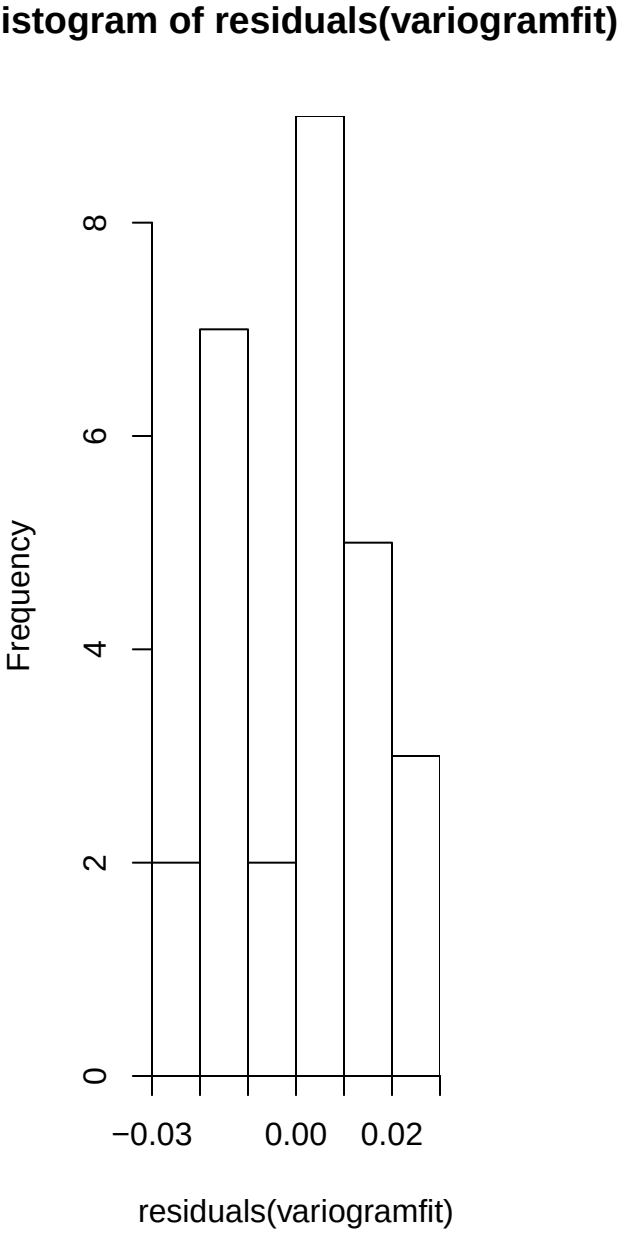

T(s) = 130.3 alfa = 0.658 sigma^2 = 0.036
Variogram
0.10
0.15
0.20
0
10
20
30
40
Lag l

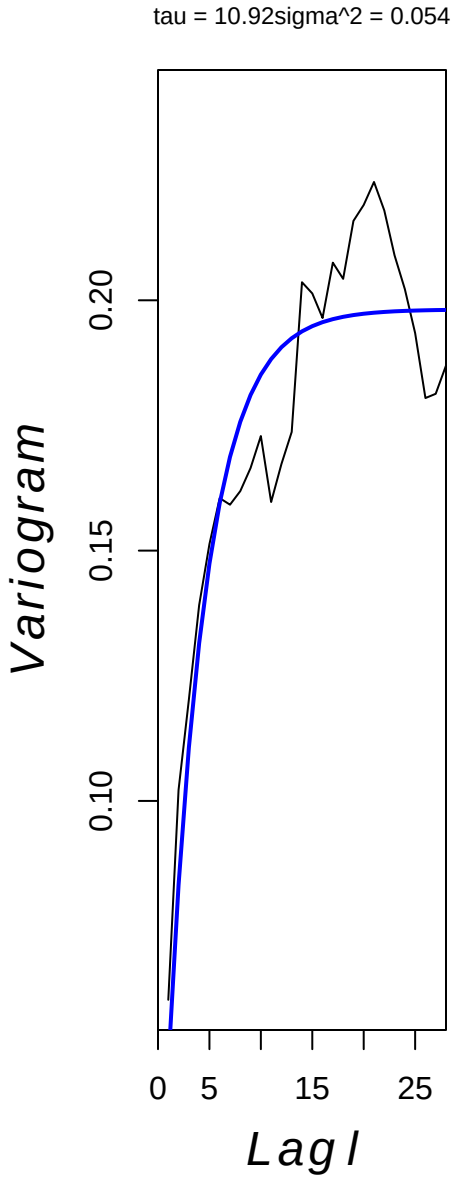

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
−0.03
0.00
0.02
residuals(variogramfit)

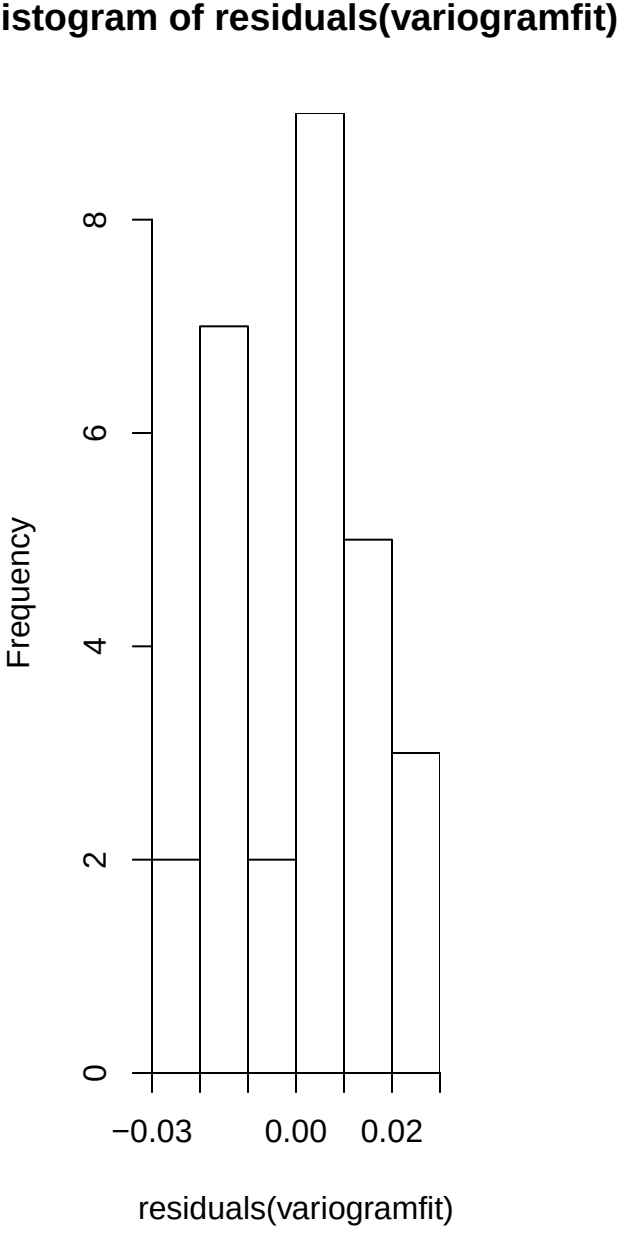

T(s) = 141.2 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.10
0.15
0.20
0
10
20
30
40
Lag l

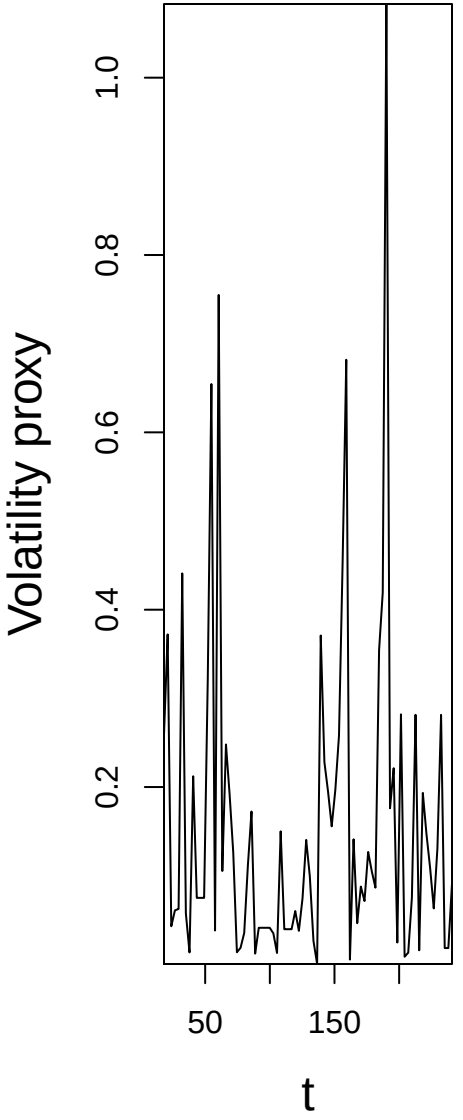

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
−0.05
0.05
0.10
residuals(variogramfit)

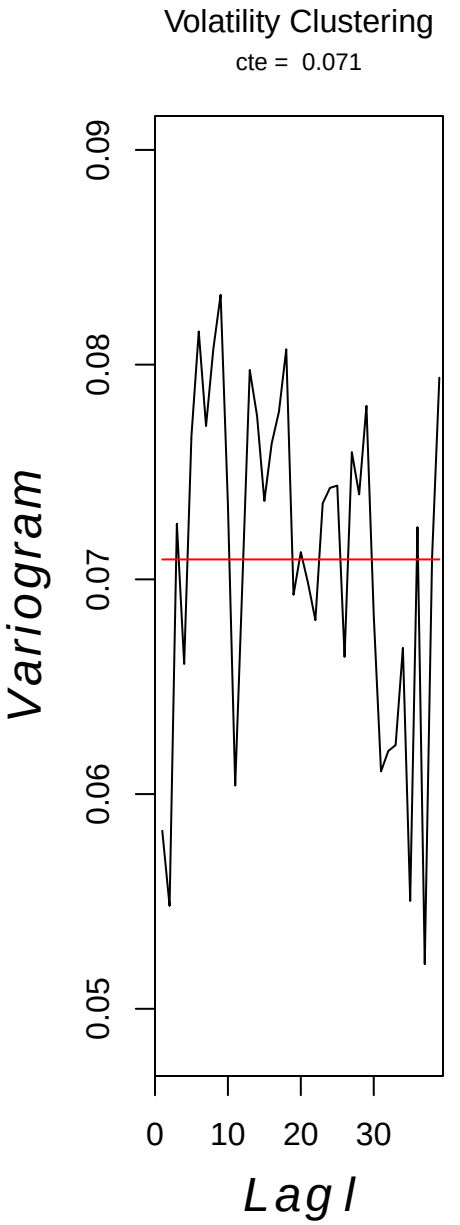

alfa = 0.762 sigma^2 = 0.042
Variogram
0.10
0.15
0.20
0
5
15
25
Lag l

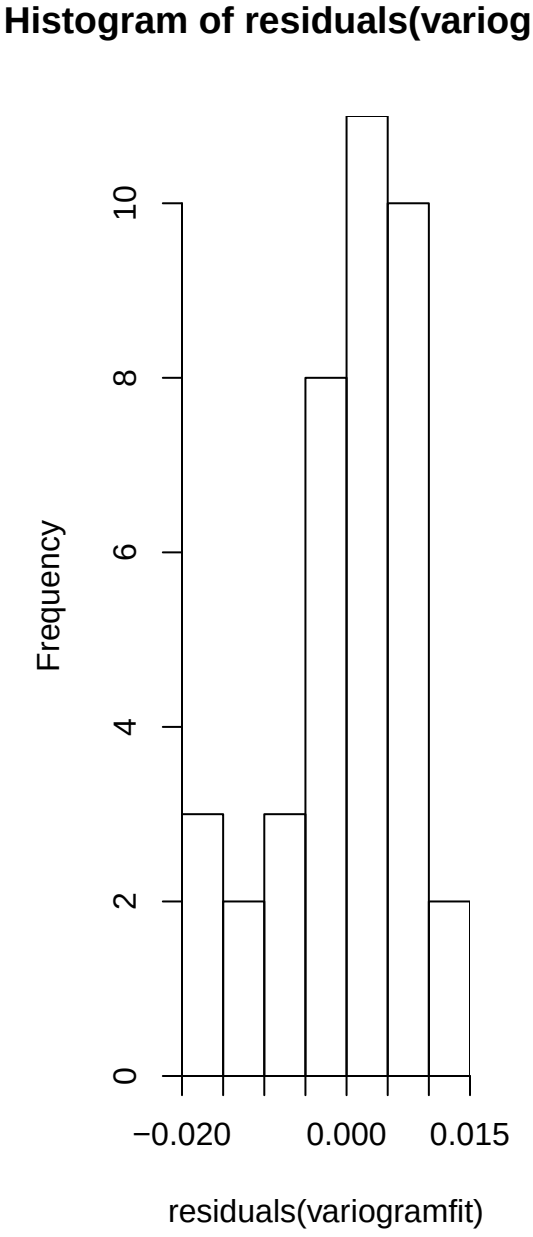

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
−0.03
0.00
0.02
residuals(variogramfit)

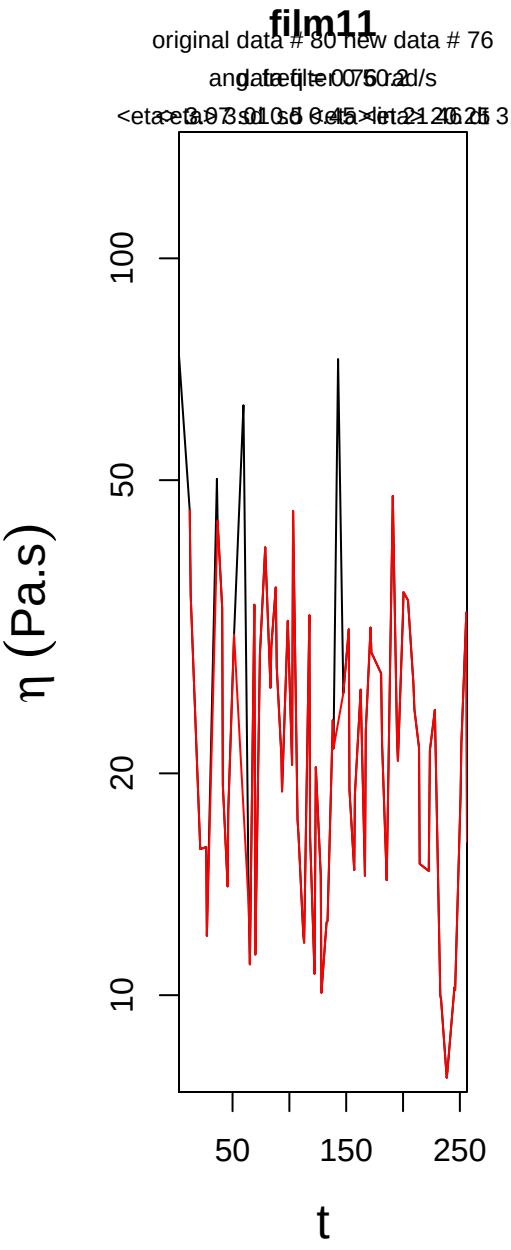

tau = 10.92sigma^2 = 0.054
Variogram
0.10
0.15
0.20
0
5
15
25
Lag l

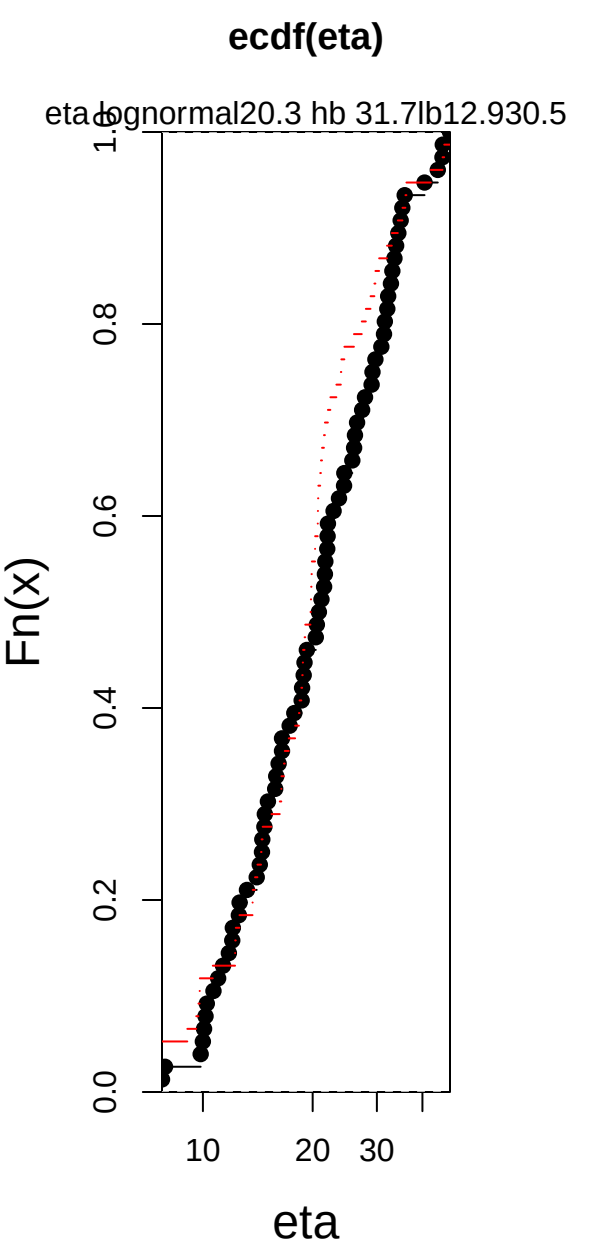

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
−0.03
0.00
0.02
residuals(variogramfit)

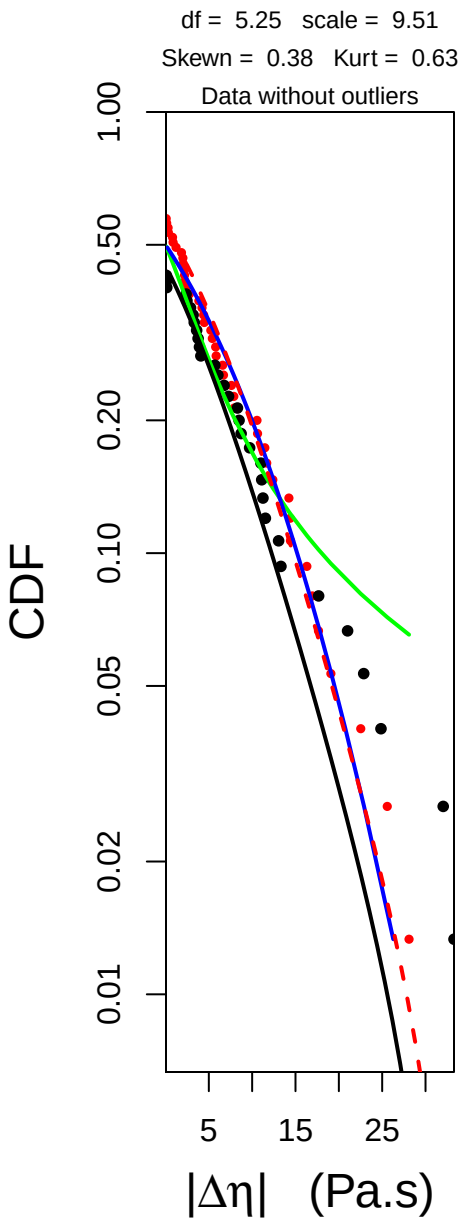

Volatility proxy
0.2
0.4
0.6
0.8
1.0
50
150
t

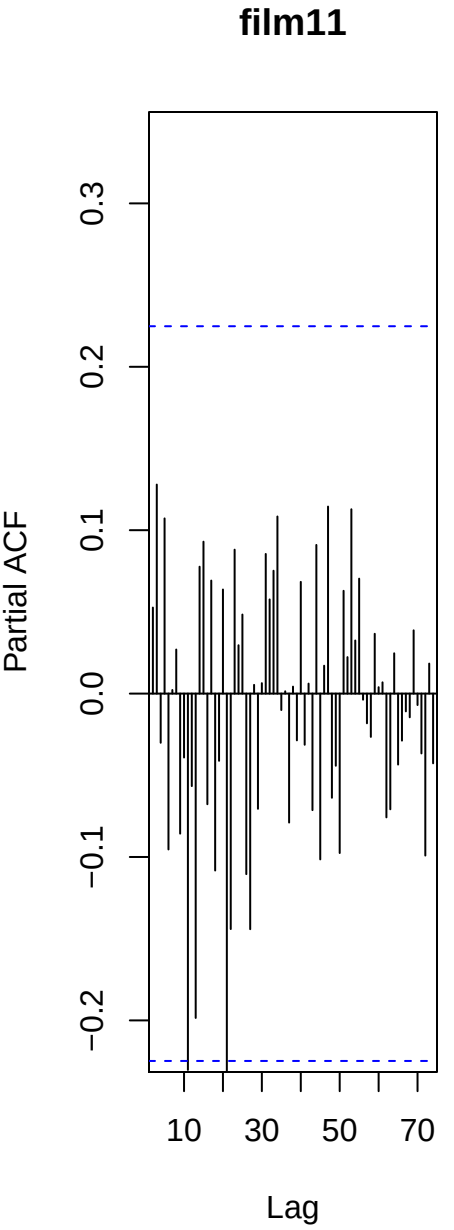

Volatility Clustering
cte = 0.071
Variogram
0.05
0.06
0.07
0.08
0.09
0
10
20
30
Lag l

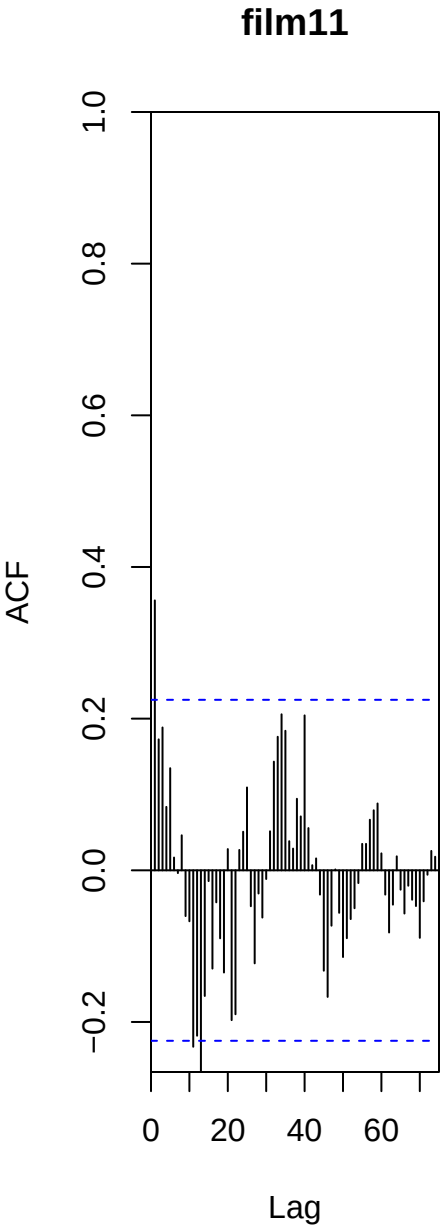

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
−0.020
0.000
0.015
residuals(variogramfit)

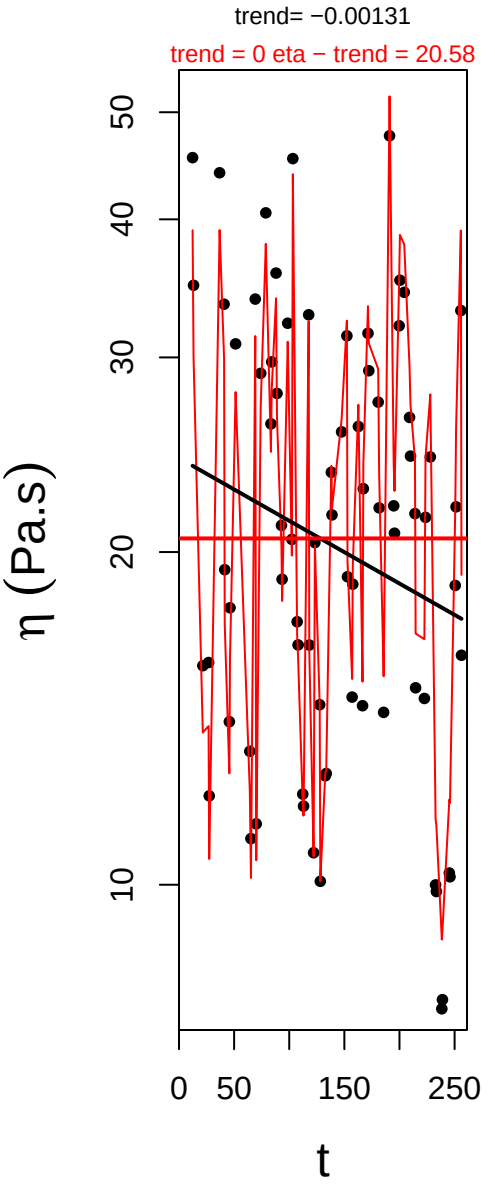

film11
original data # 80 new data # 76
η (Pa.s)
t

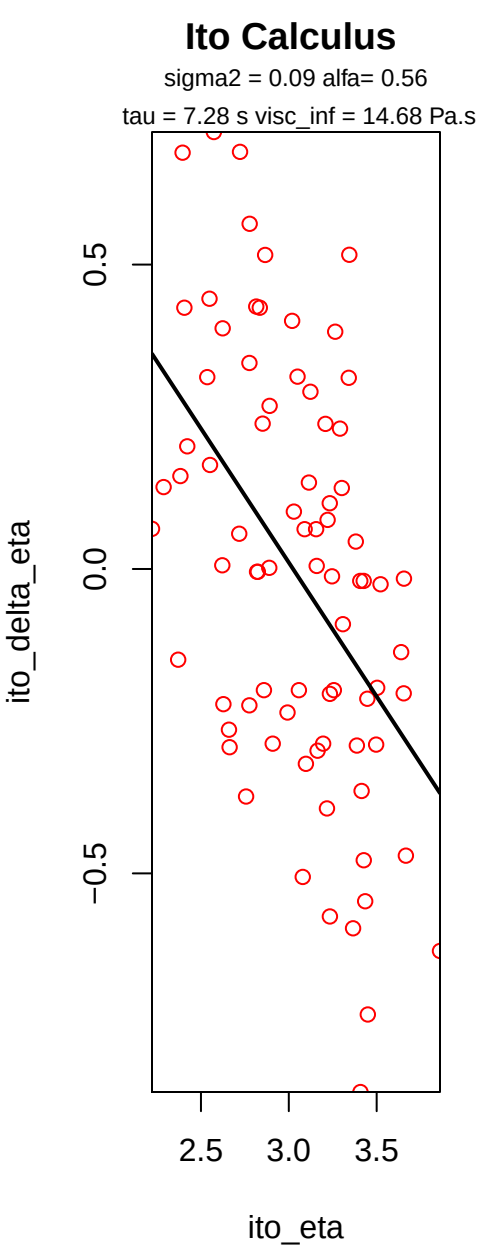

ecdf(eta)
eta lognormal20.3 hb 31.7lb12.930.5
Fn(x)
eta

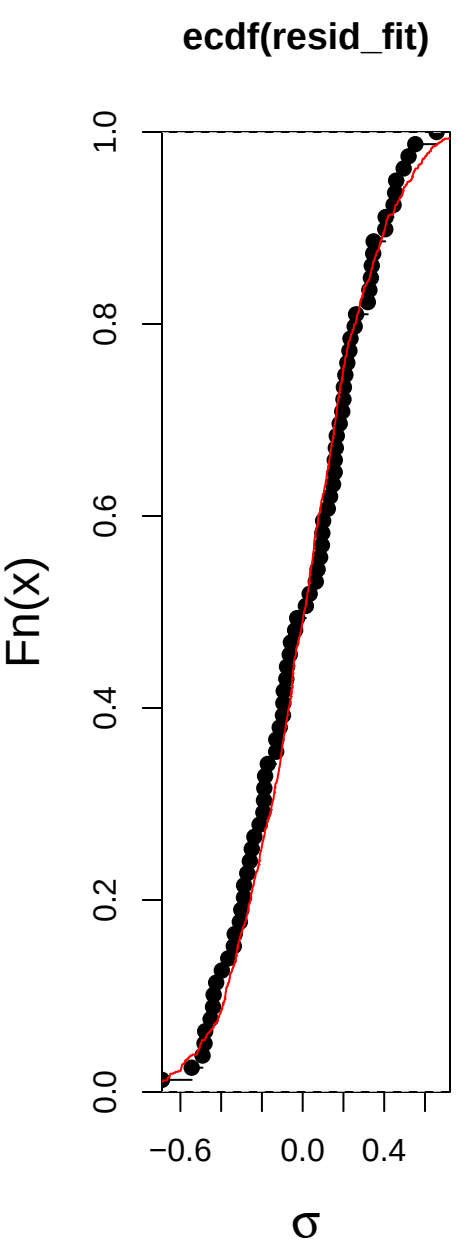

df = 5.25 scale = 9.51
Skewn = 0.38 Kurt = 0.63
Data without outliers
CDF
1.00
0.50
0.20
0.10
0.05
0.02
0.01
5
15
25
|Δη| (Pa.s)

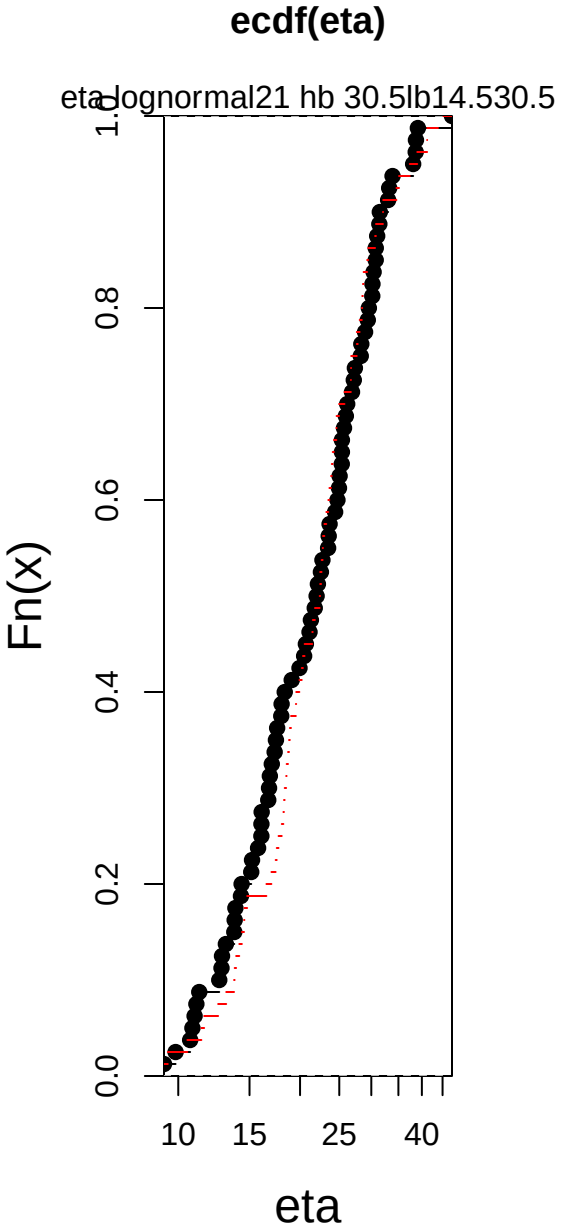

film11
Partial ACF
0.3
0.2
0.1
0.0
−0.1
−0.2
10
30
50
70
Lag

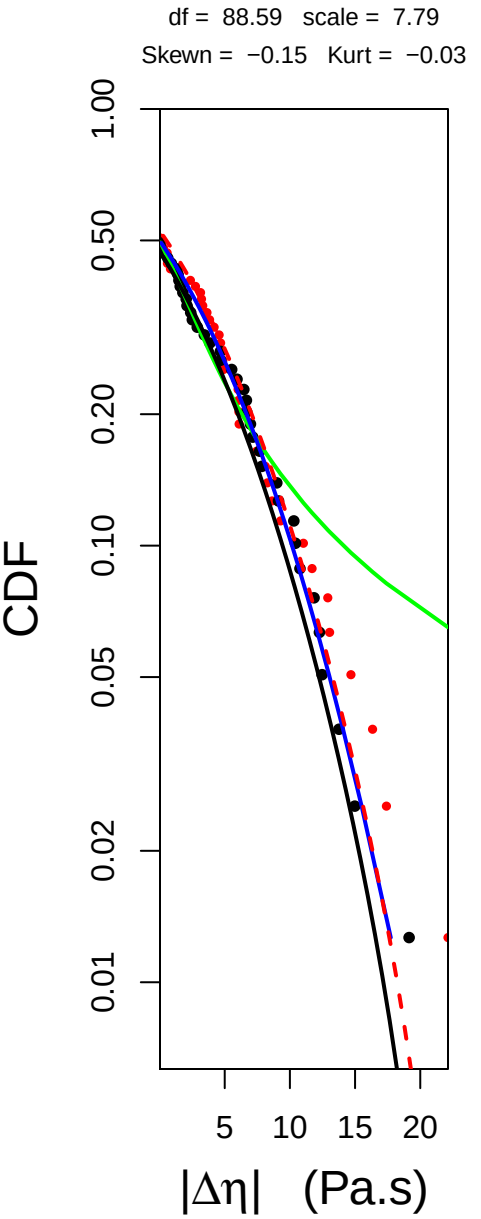

film11
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
20
40
60
Lag


trend= −0.00131
trend = 0 eta − trend = 20.58
η (Pa.s)
50
40
30
20
10
0
50
150
250
t

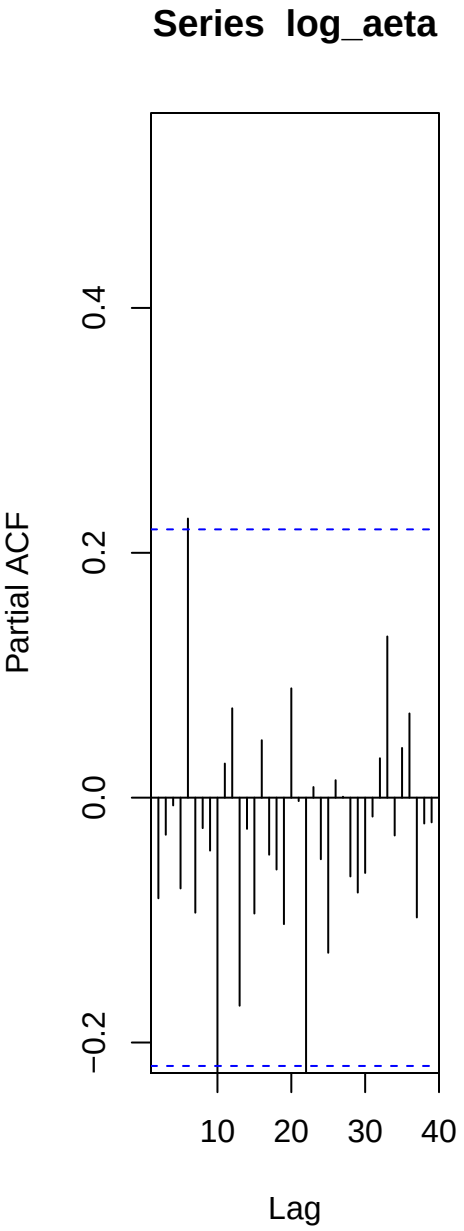

Ito Calculus
sigma2 = 0.09 alfa= 0.56
tau = 7.28 s visc_inf = 14.68 Pa.s
ito_delta_eta
0.5
0.0
−0.5
2.5
3.0
3.5
ito_eta

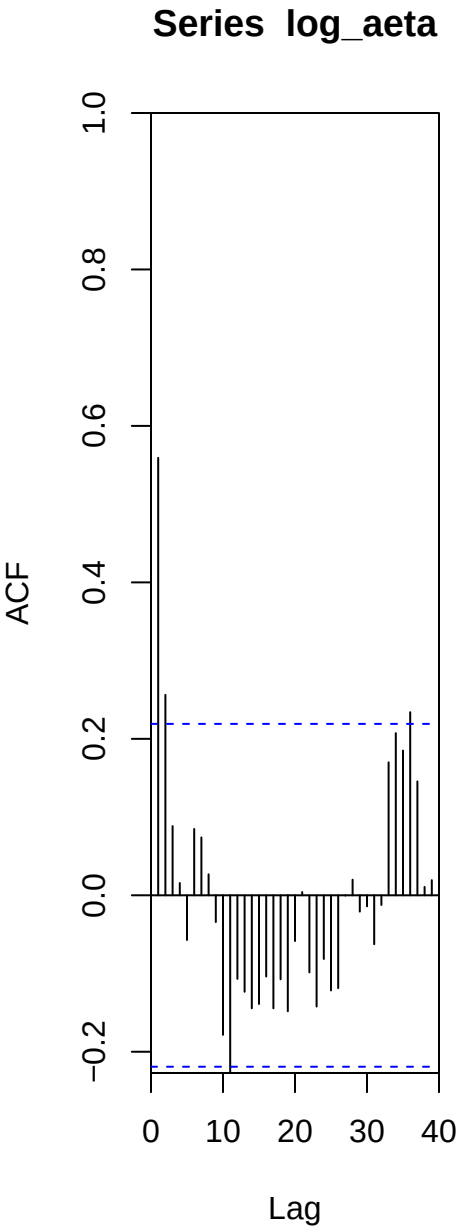

ecdf(resid_fit)
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
−0.6
0.0
0.4
σ

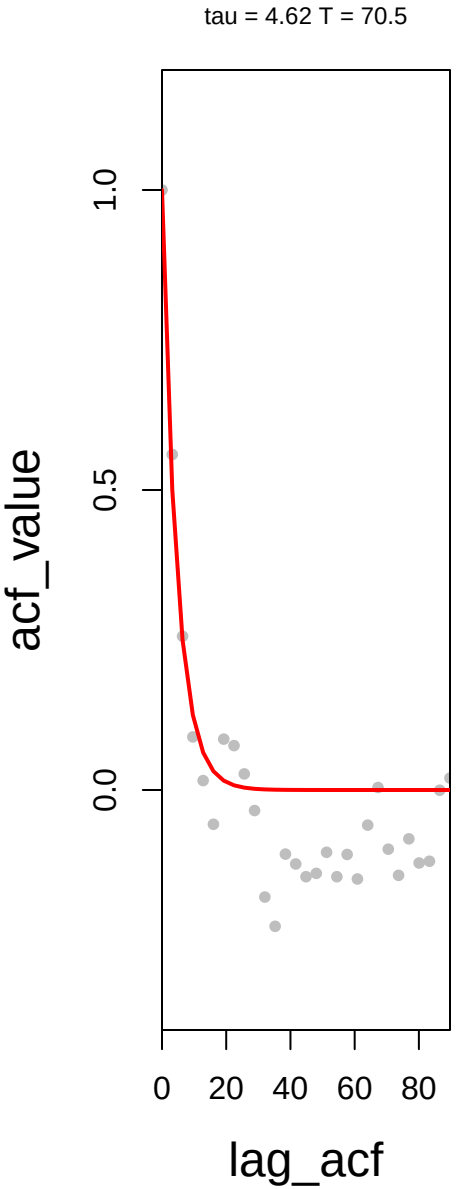


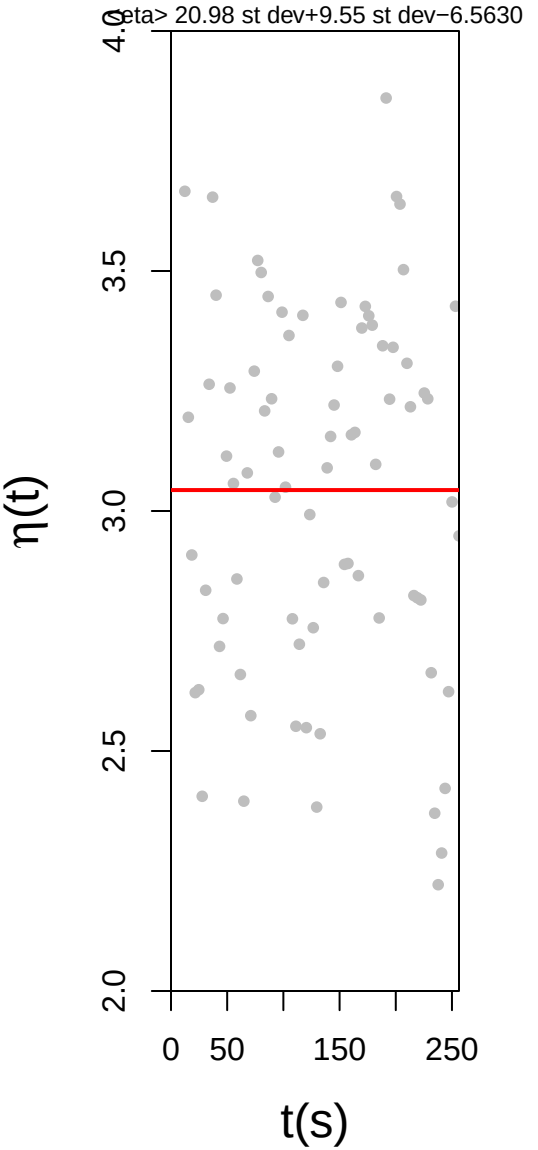


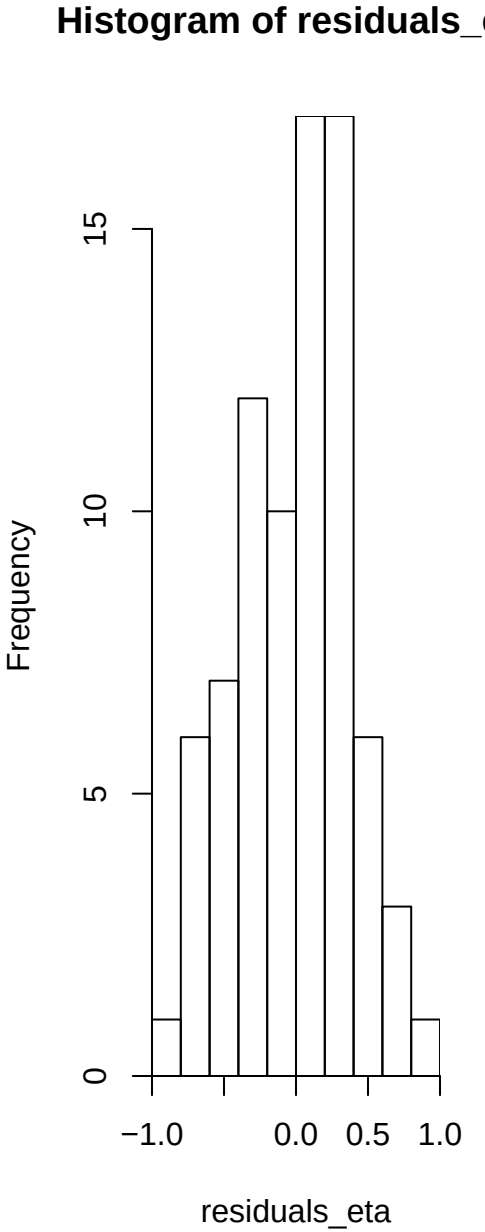
original data #

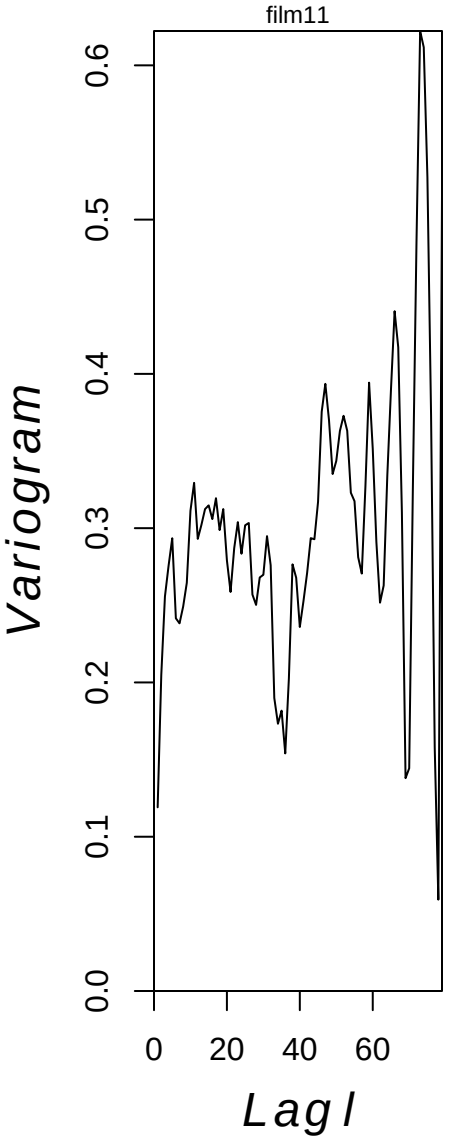

Series log_aeta
Partial ACF
0.4
0.2
0.0
−0.2
10
20
30
40
Lag

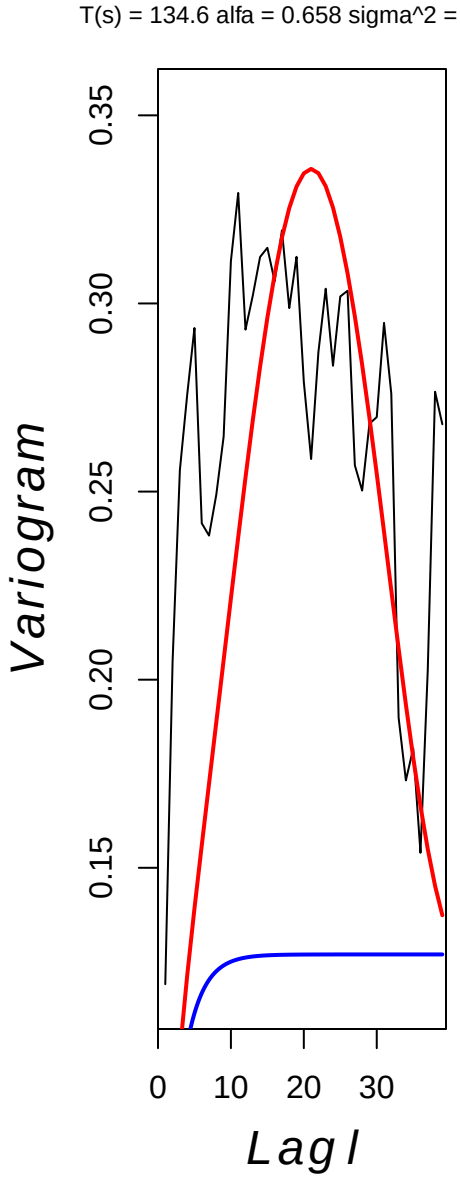

Series log_aeta
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
10
20
30
40
Lag

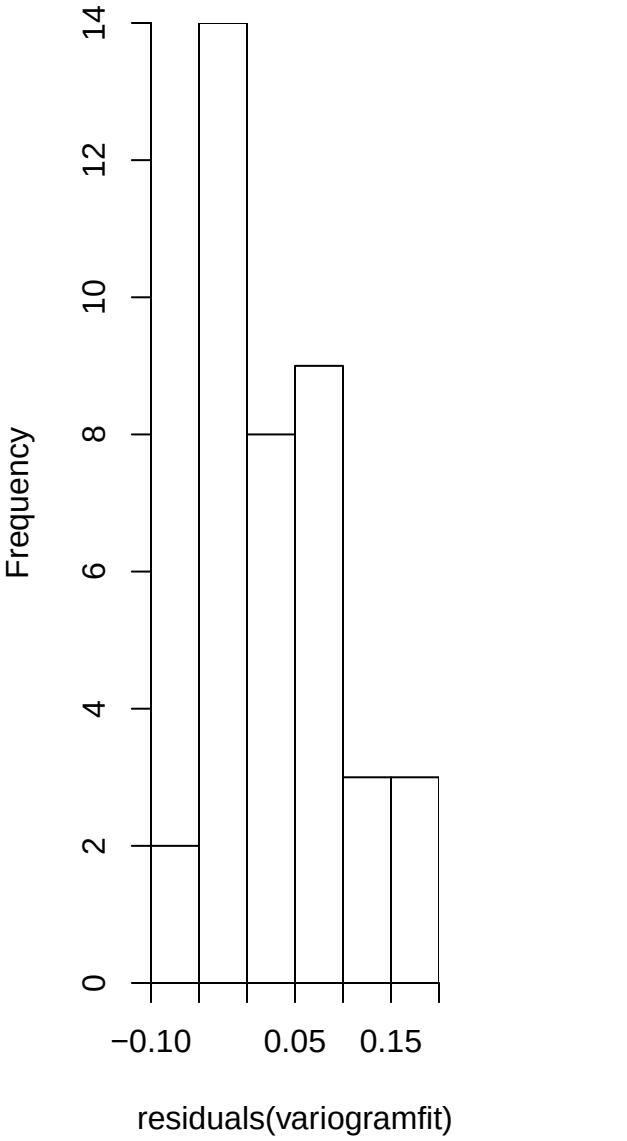

tau = 4.62 T = 70.5
acf_value
1.0
0.5
0.0
0
20
40
60
80
lag_acf

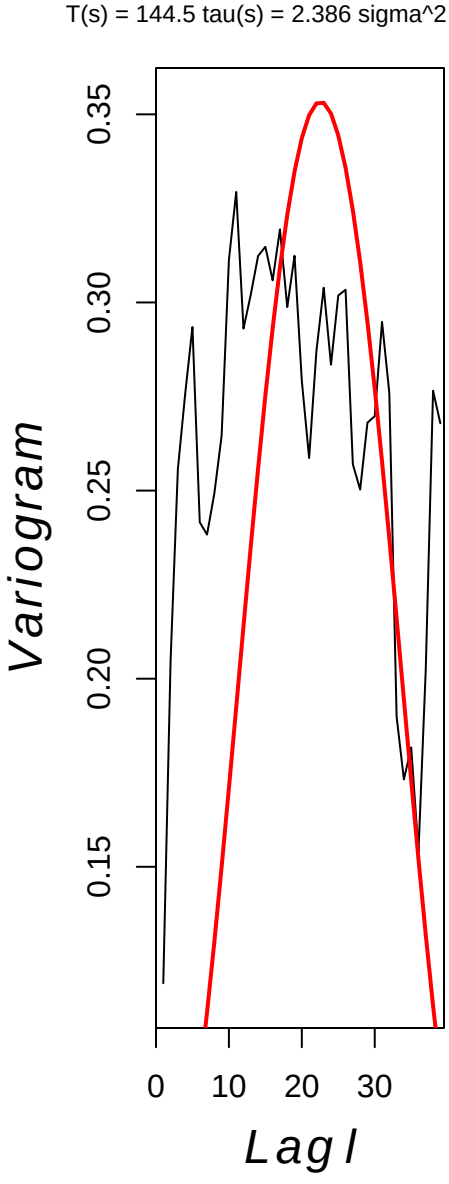

eta> 20.98 st dev+9.55 st dev−6.5630
η(t)
4.0
3.5
3.0
2.5
2.0
0
50
150
250
t(s)

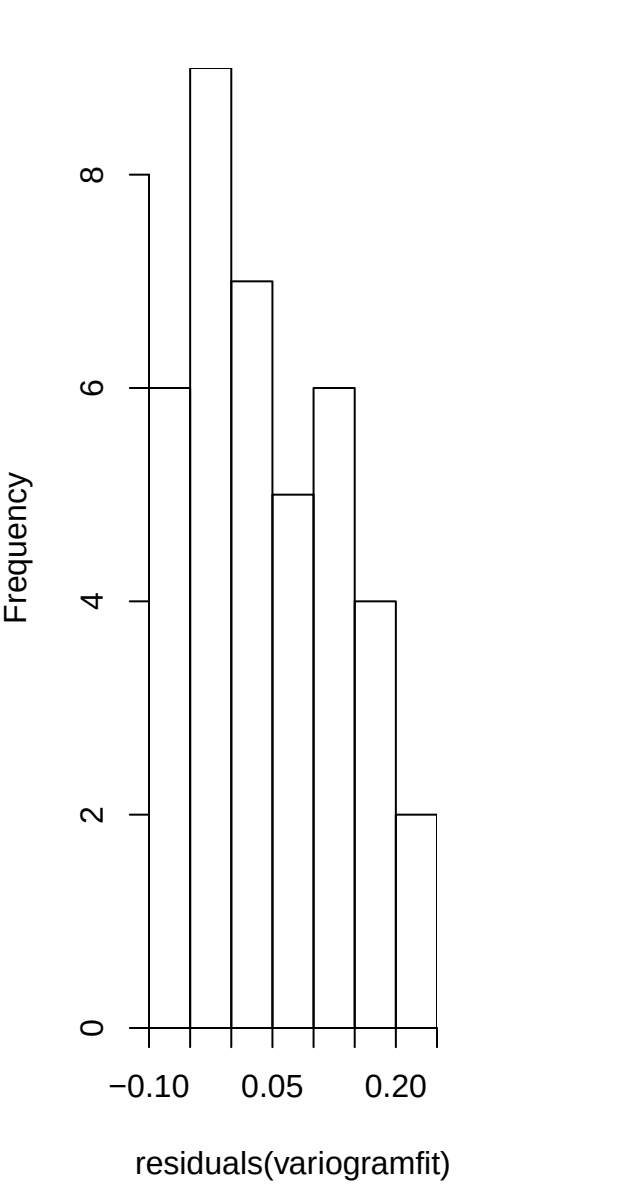

Histogram of residuals_eta
Frequency
0
5
10
15
−1.0
0.0
0.5
1.0
residuals_eta

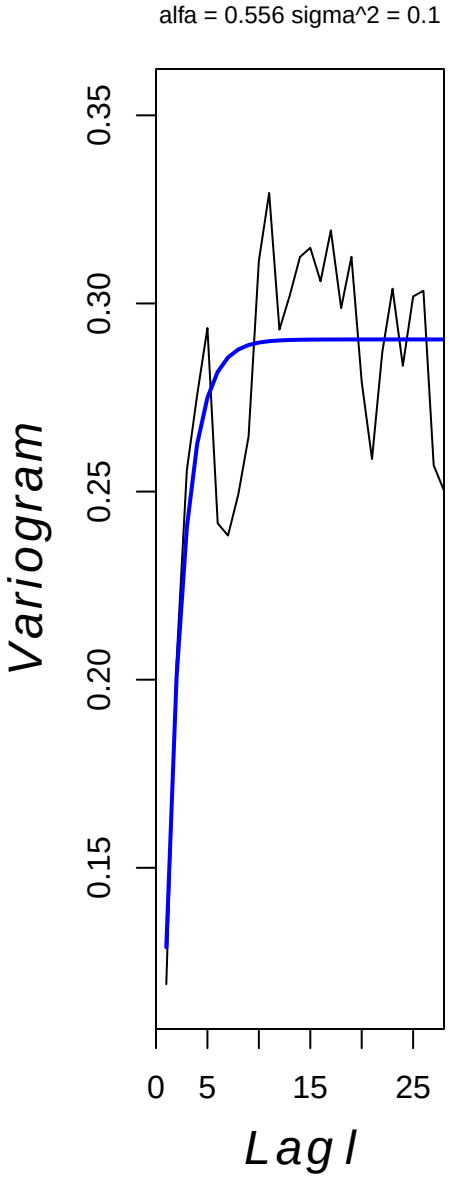

film11
Variogram
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0
20
40
60
Lag l

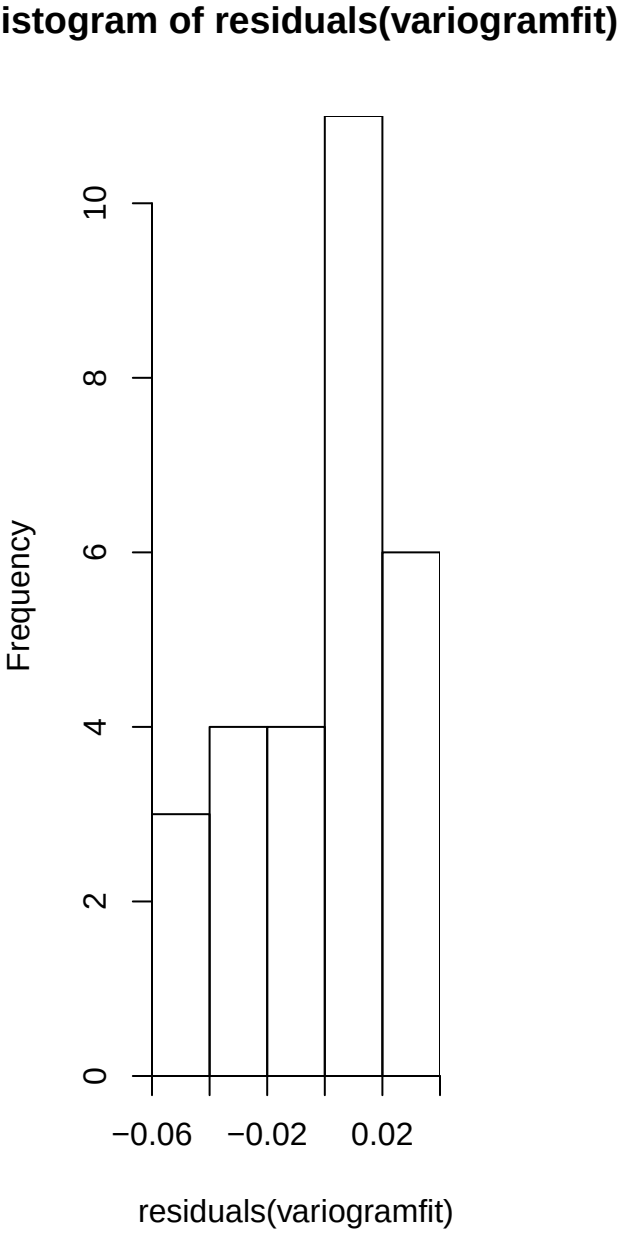

T(s) = 134.6 alfa = 0.658 sigma^2 = 0.036
Variogram
0.15
0.20
0.25
0.30
0.35
0
10
20
30
Lag l

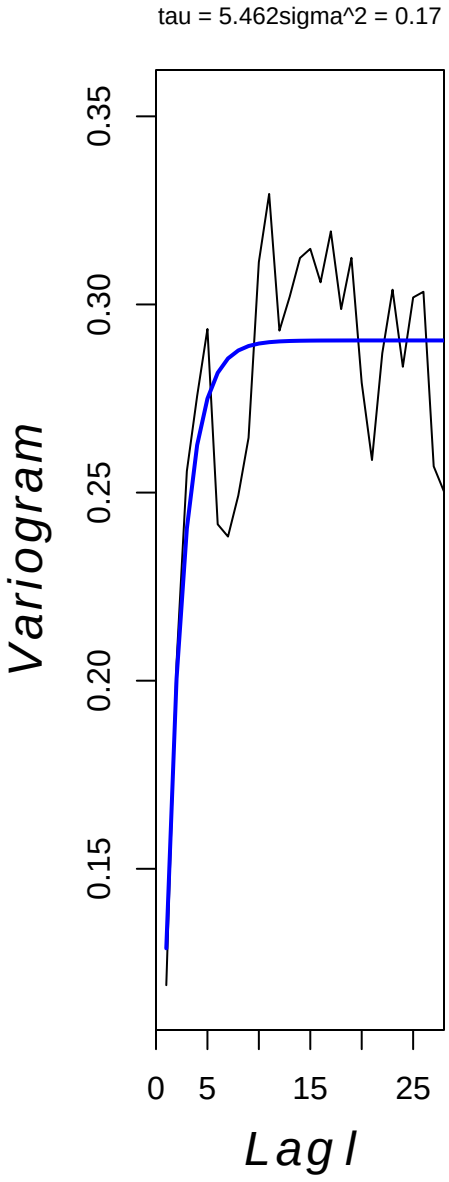

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
12
14
−0.10
0.05
0.15
residuals(variogramfit)

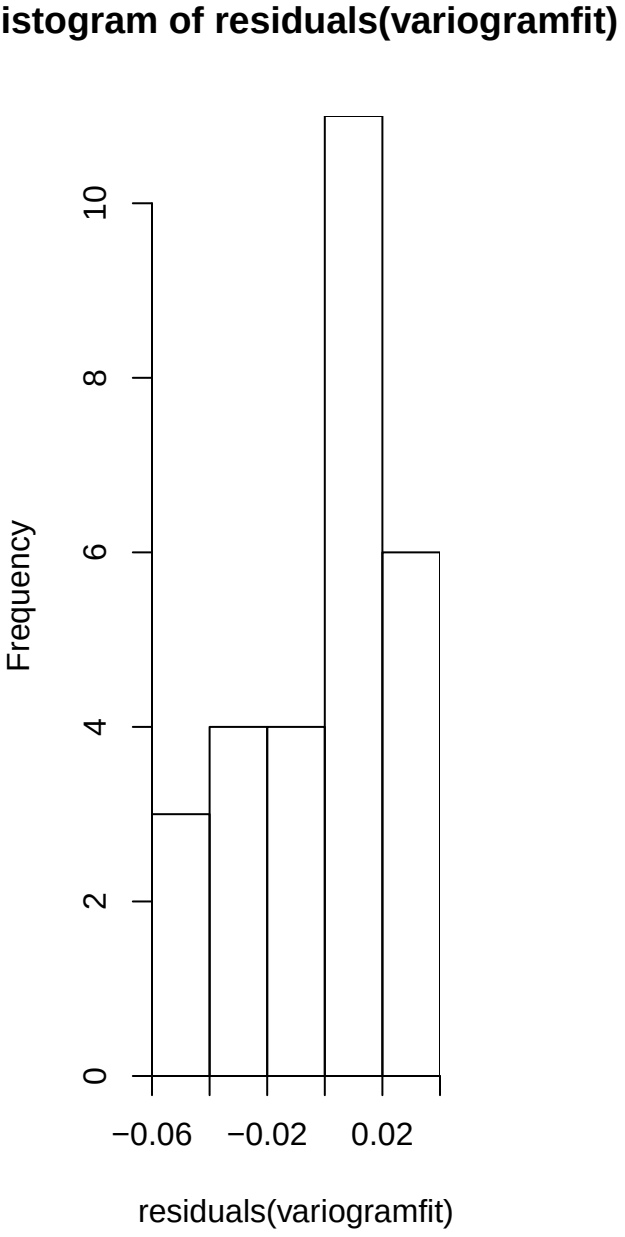

T(s) = 144.5 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.15
0.20
0.25
0.30
0.35
0
10
20
30
Lag l

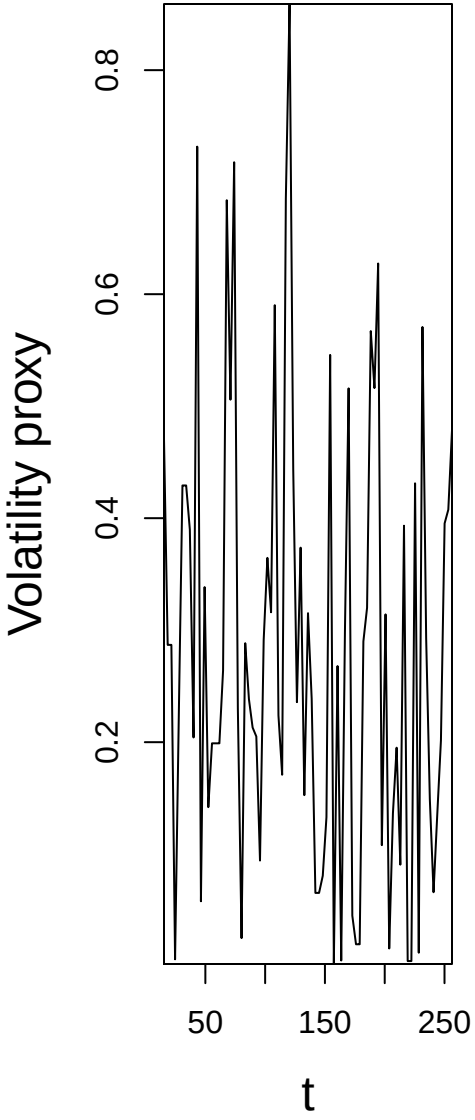

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
−0.10
0.05
0.20
residuals(variogramfit)

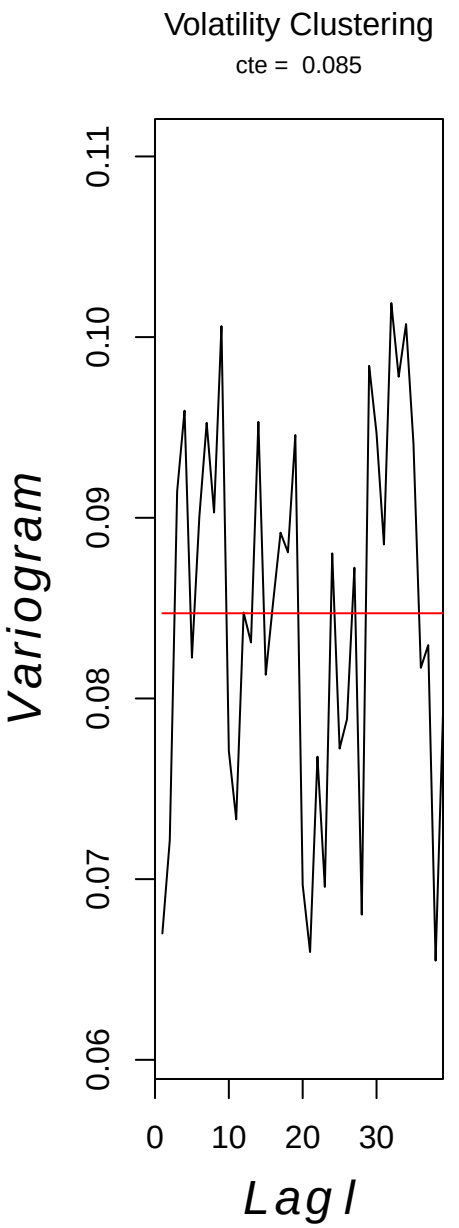

alfa = 0.556 sigma^2 = 0.1
Variogram
0.15
0.20
0.25
0.30
0.35
0
5
15
25
Lag l

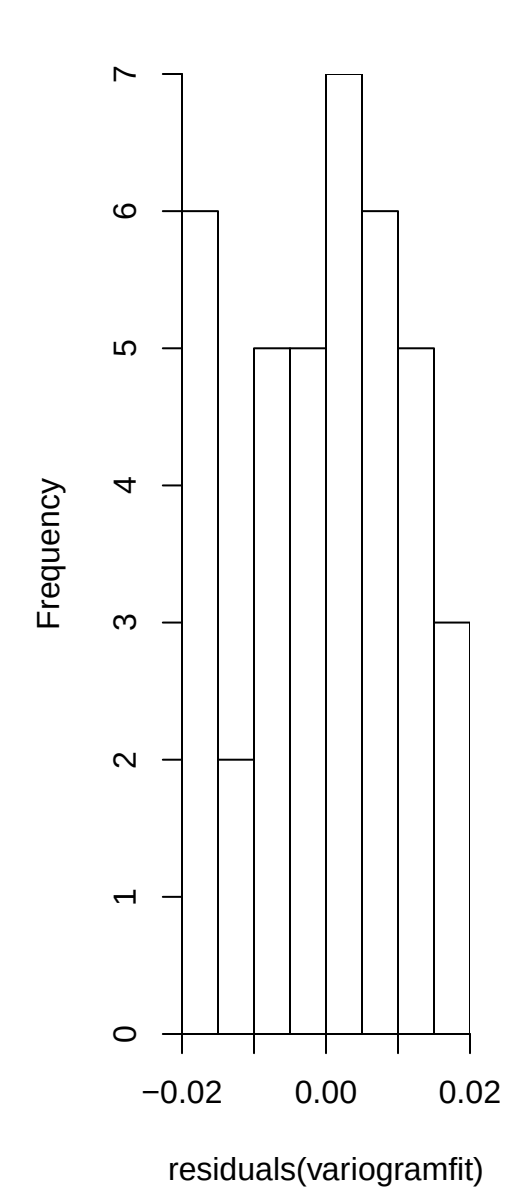

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
−0.06
−0.02
0.02
residuals(variogramfit)

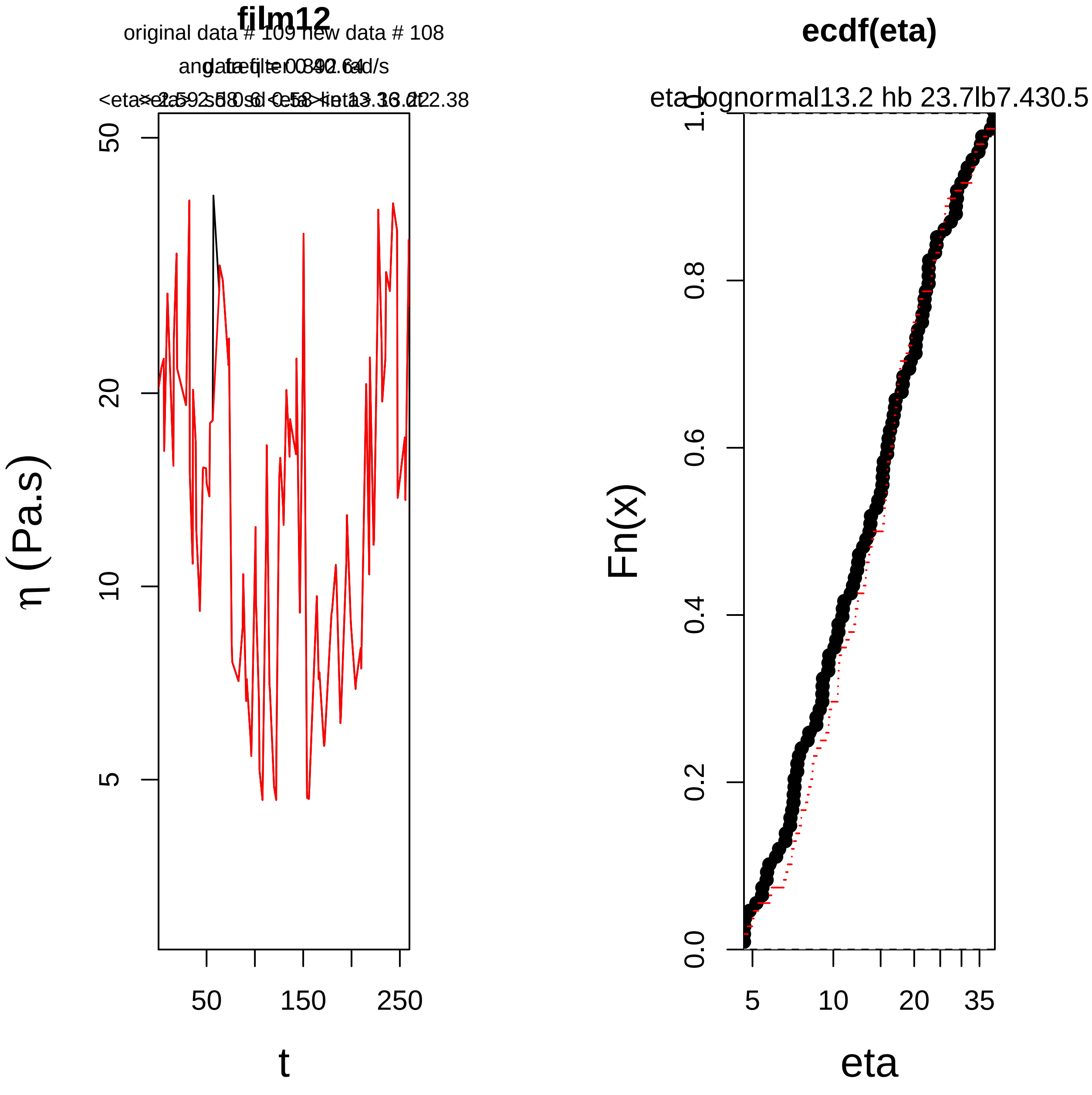

tau = 5.462sigma^2 = 0.17
Variogram
0.15
0.20
0.25
0.30
0.35
0
5
15
25
Lag l

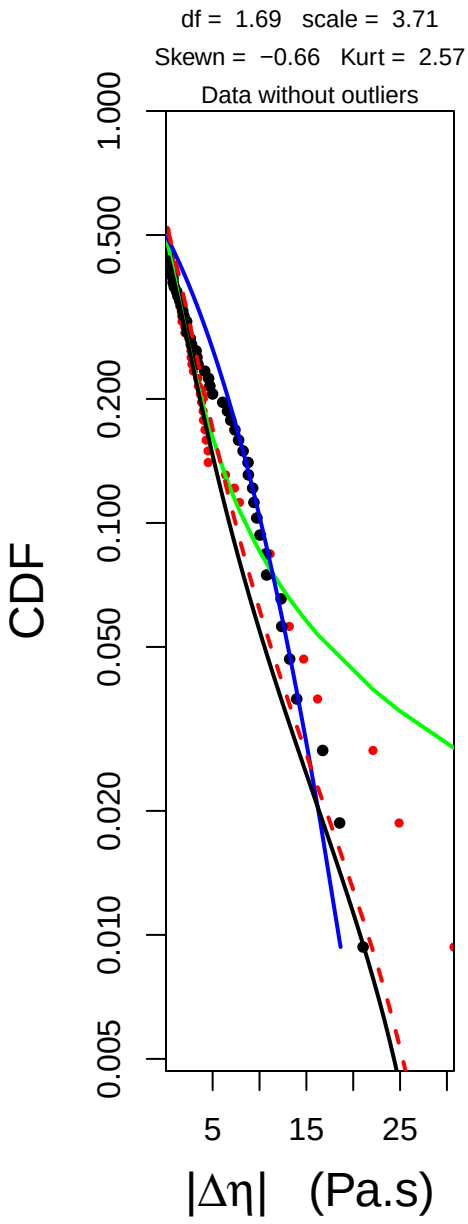

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
−0.06
−0.02
0.02
residuals(variogramfit)

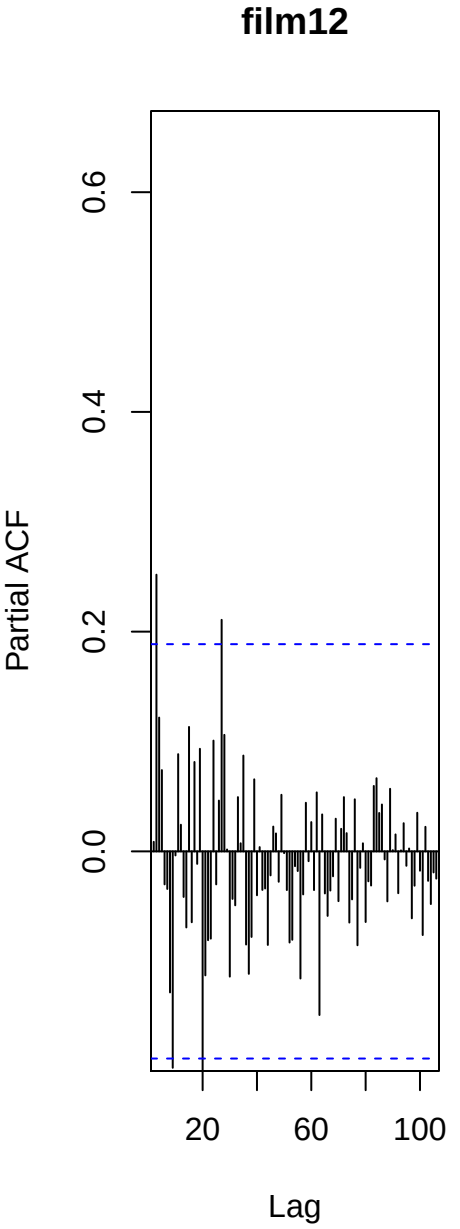

Volatility proxy
0.2
0.4
0.6
0.8
50
150
250
t

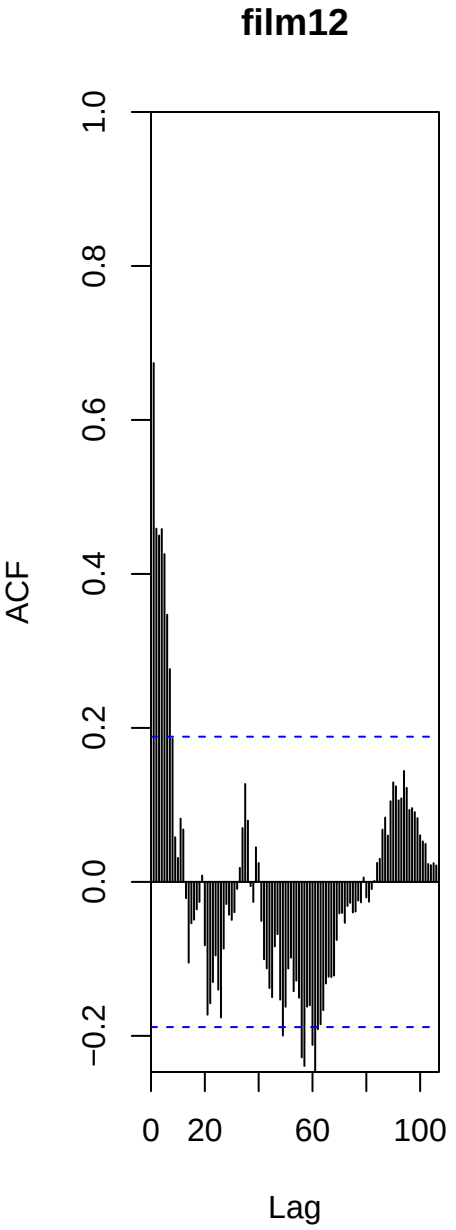

Volatility Clustering
cte = 0.085
Variogram
0.06
0.07
0.08
0.09
0.10
0.11
0
10
20
30
Lag l

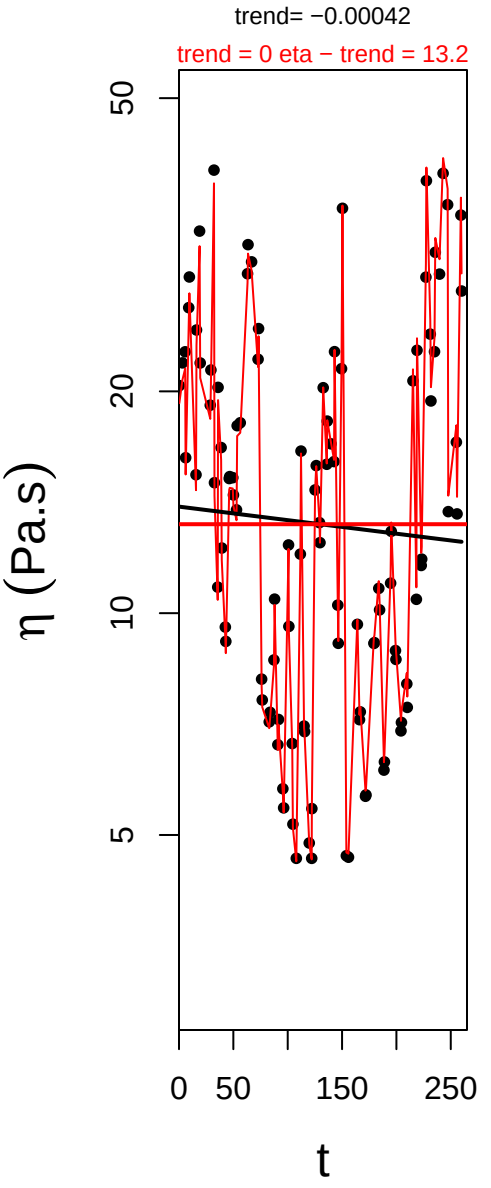

Histogram of residuals(variogramfit)
Frequency
0
1
2
3
4
5
6
7
−0.02
0.00
0.02
residuals(variogramfit)

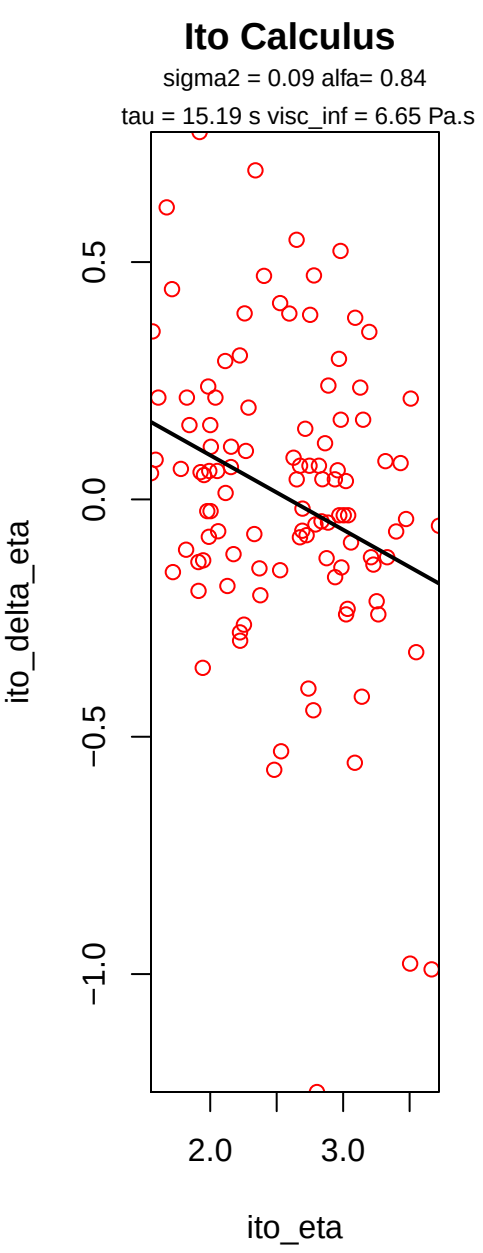

film12
original data # 109 new data # 108
angle freq= 0.392 rad/s
data filter 0.2 0.64
<eta>=12.5 sd 0.58 lim 13.3 22.38
50
20
10
5
η (Pa.s)
50
150
250
t
ecdf(eta)
eta lognormal13.2 hb 23.7lb7.430.5
1.0
0.8
0.6
0.4
0.2
0.0
Fn(x)
5
10
20
35
eta

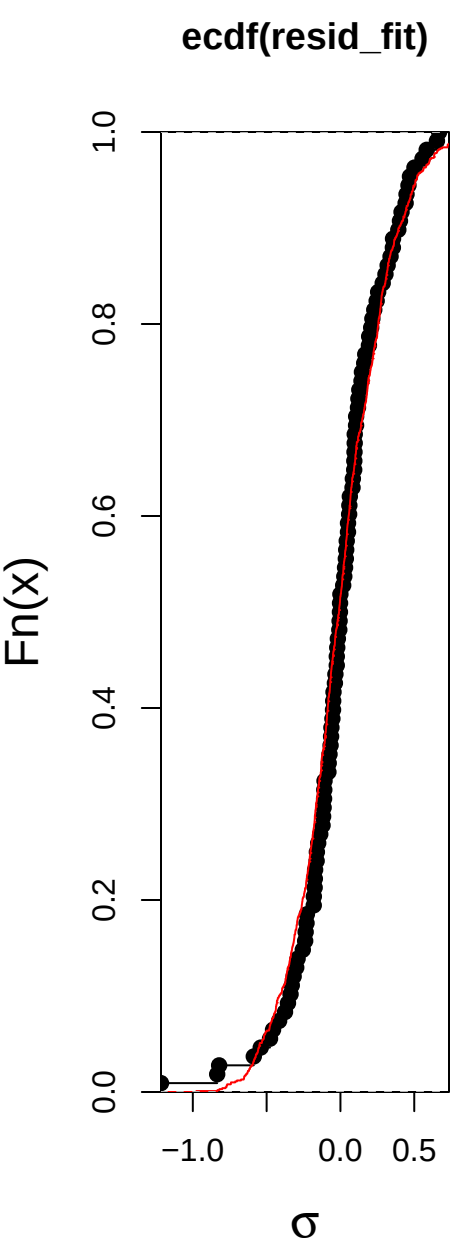

df = 1.69 scale = 3.71
Skewn = −0.66 Kurt = 2.57
Data without outliers
CDF
1.000
0.500
0.200
0.100
0.050
0.020
0.010
0.005
5
15
25
|Δη| (Pa.s)

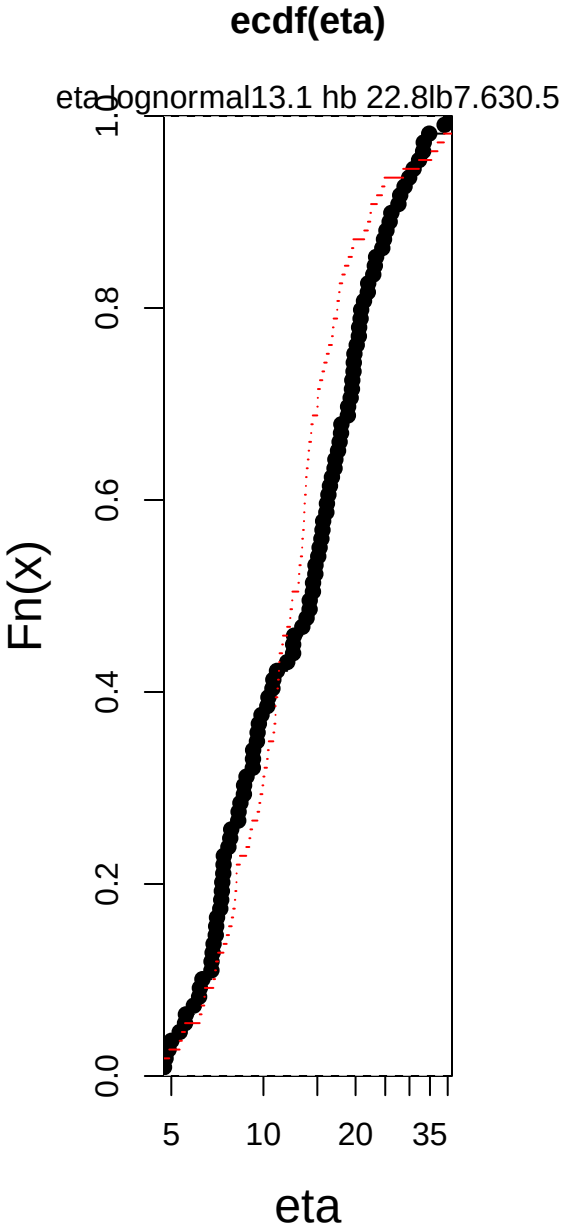

film12
Partial ACF
0.6
0.4
0.2
0.0
20
60
100
Lag

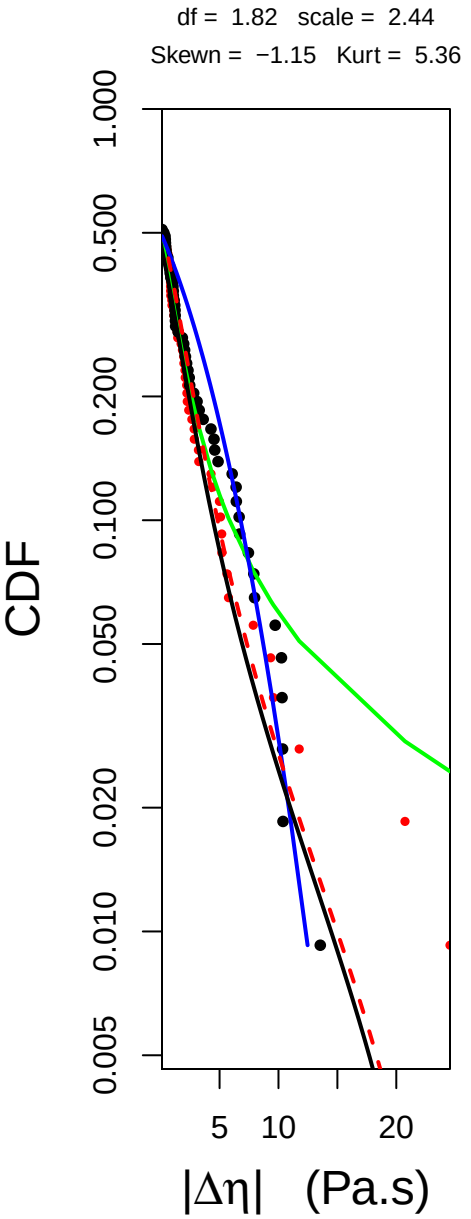

film12
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
20
60
100
Lag


trend= −0.00042
trend = 0 eta − trend = 13.2
η (Pa.s)
50
20
10
5
0
50
150
250
t

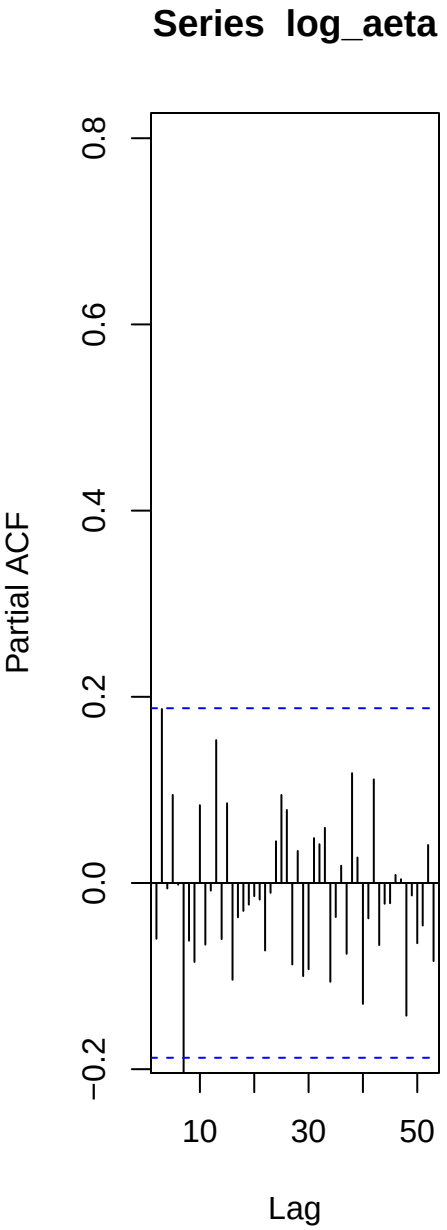

Ito Calculus
sigma2 = 0.09 alfa= 0.84
tau = 15.19 s visc_inf = 6.65 Pa.s
ito_delta_eta
0.5
0.0
−0.5
−1.0
2.0
3.0
ito_eta

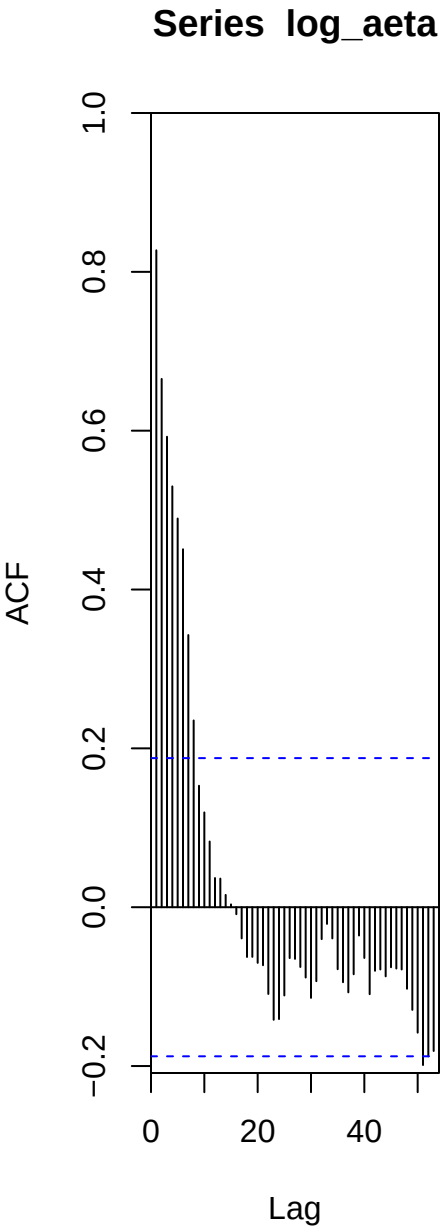

ecdf(resid_fit)
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
−1.0
0.0
0.5
σ

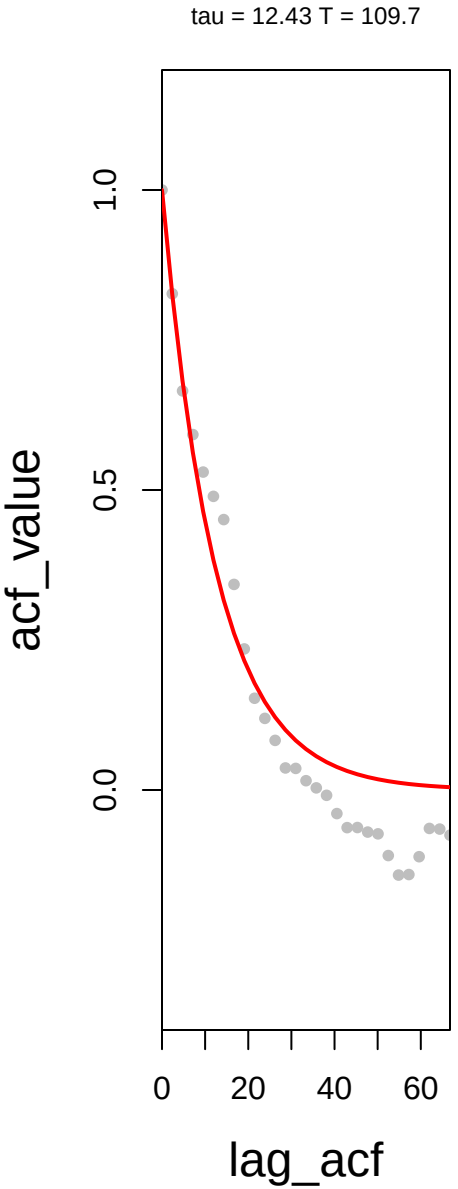


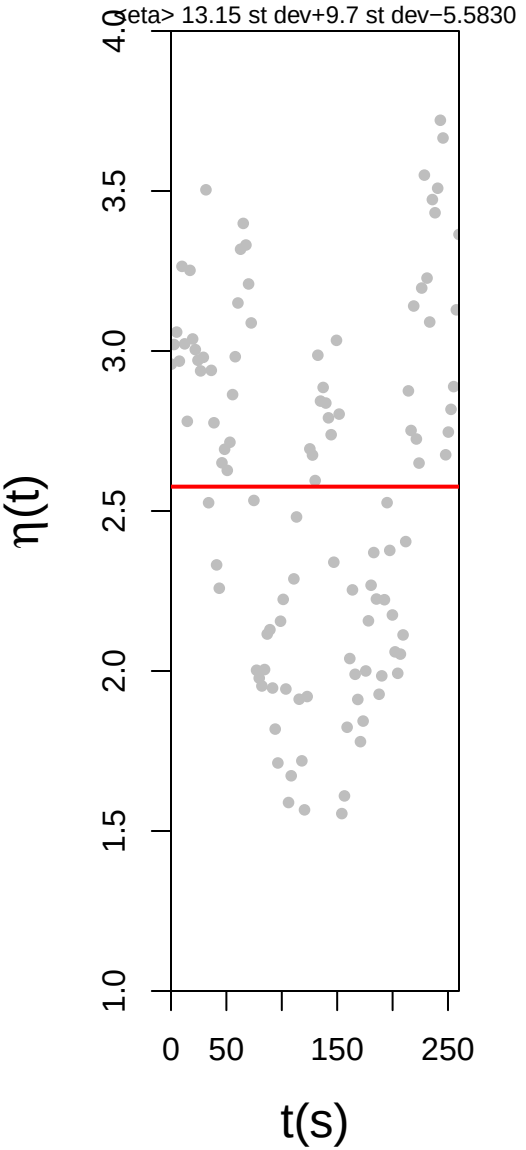


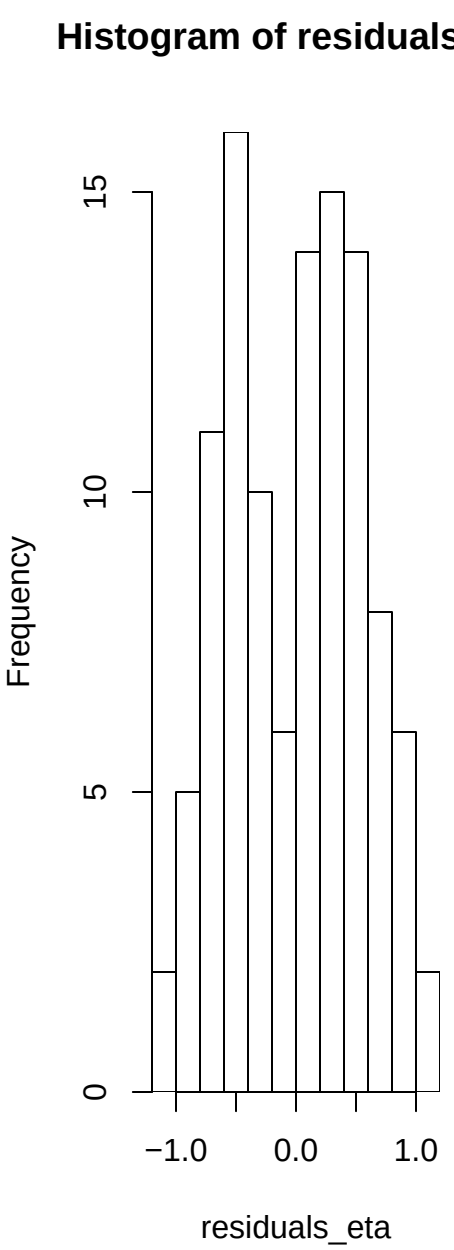
riginal data #

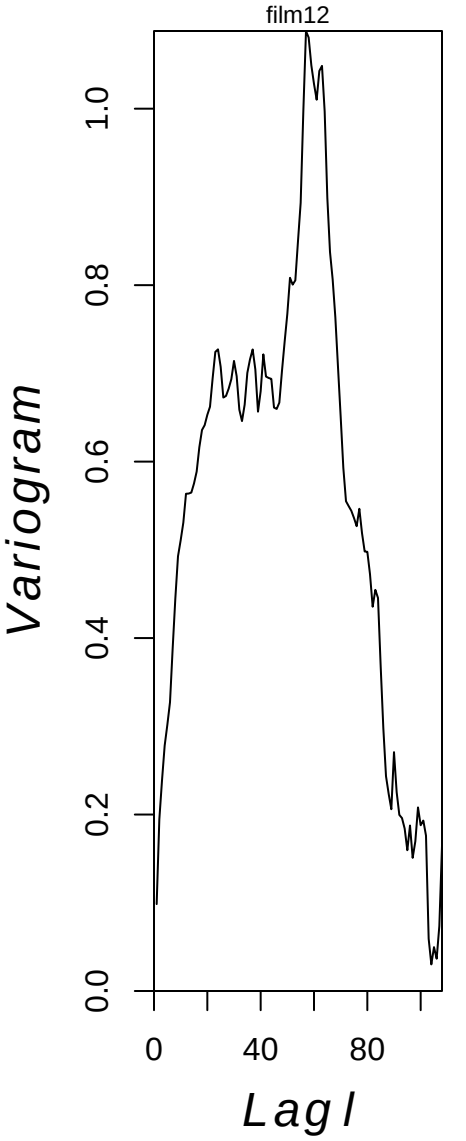

Series log_aeta
Partial ACF
0.8
0.6
0.4
0.2
0.0
−0.2
10
30
50
Lag

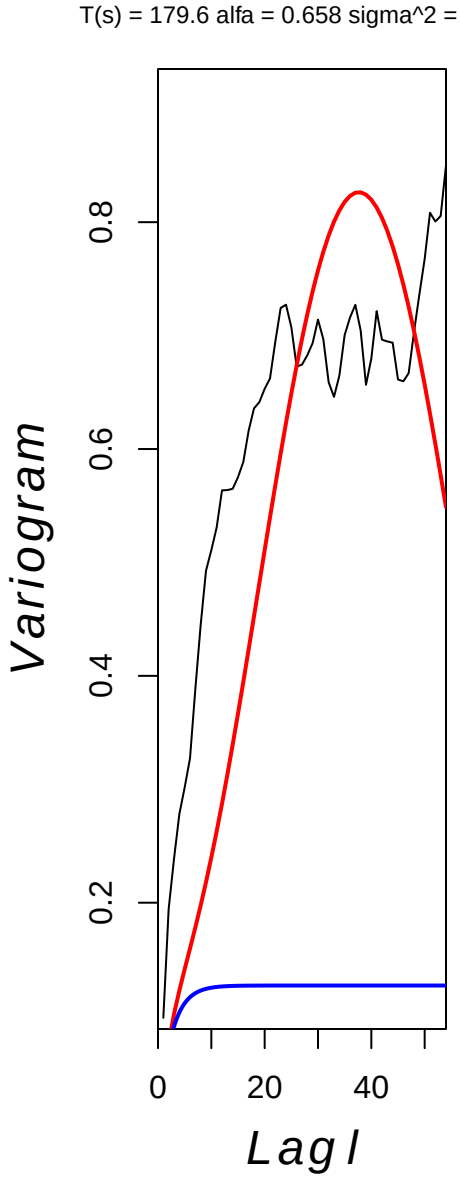

Series log_aeta
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
20
40
Lag

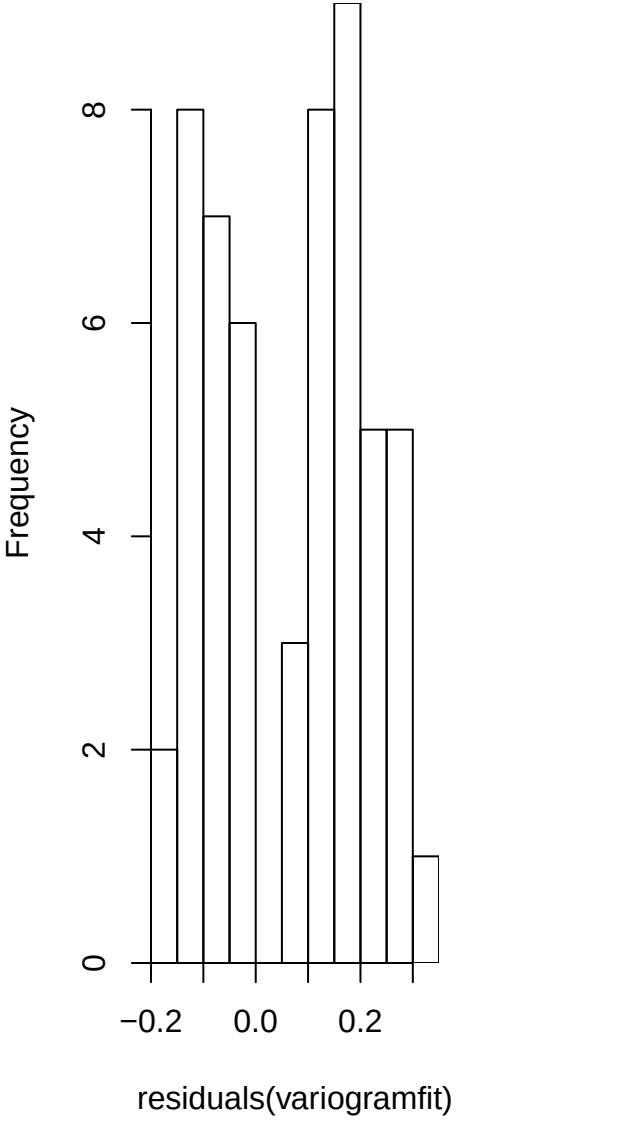

tau = 12.43 T = 109.7
acf_value
0.0
0.5
1.0
0
20
40
60
lag_acf

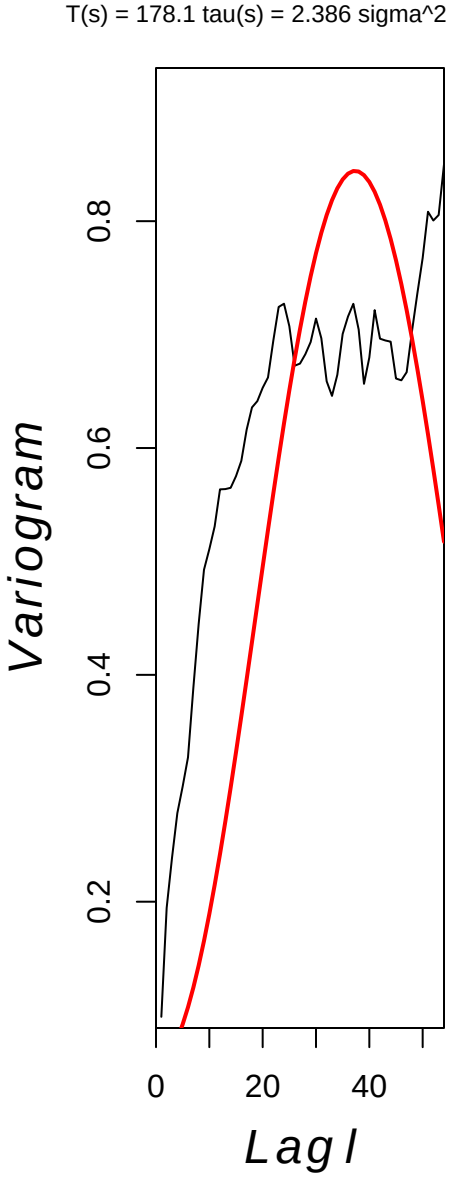

eta> 13.15 st dev+9.7 st dev−5.5830
η(t)
1.0
1.5
2.0
2.5
3.0
3.5
4.0
0
50
150
250
t(s)

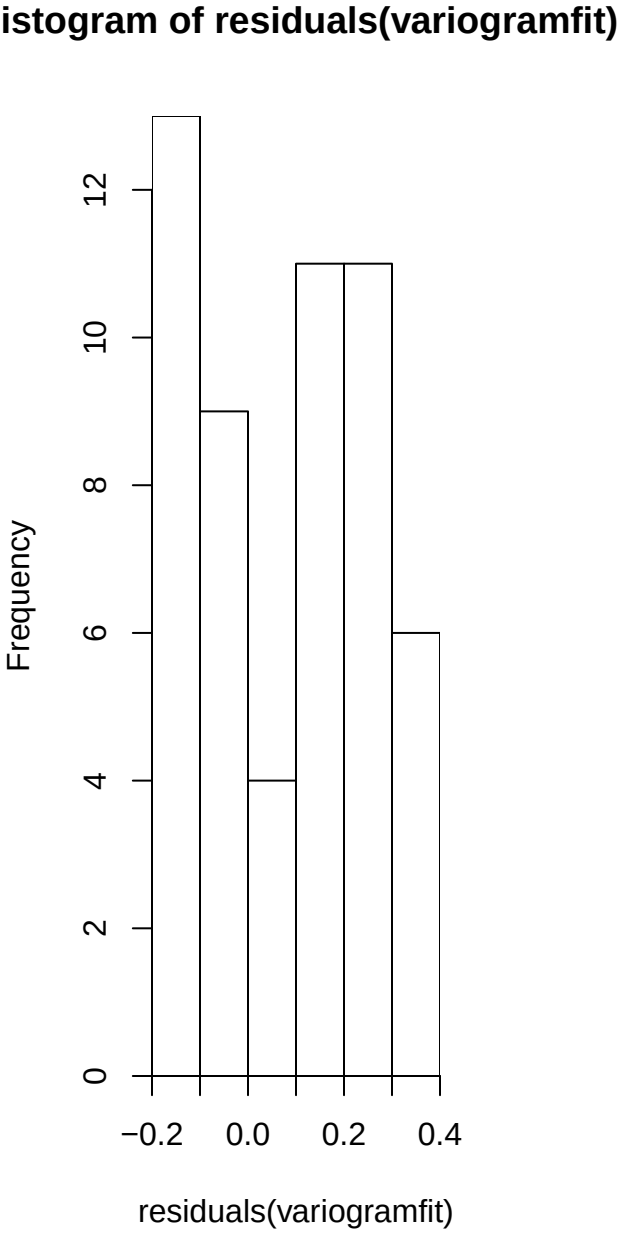

Histogram of residuals_eta
Frequency
0
5
10
15
−1.0
0.0
1.0
residuals_eta

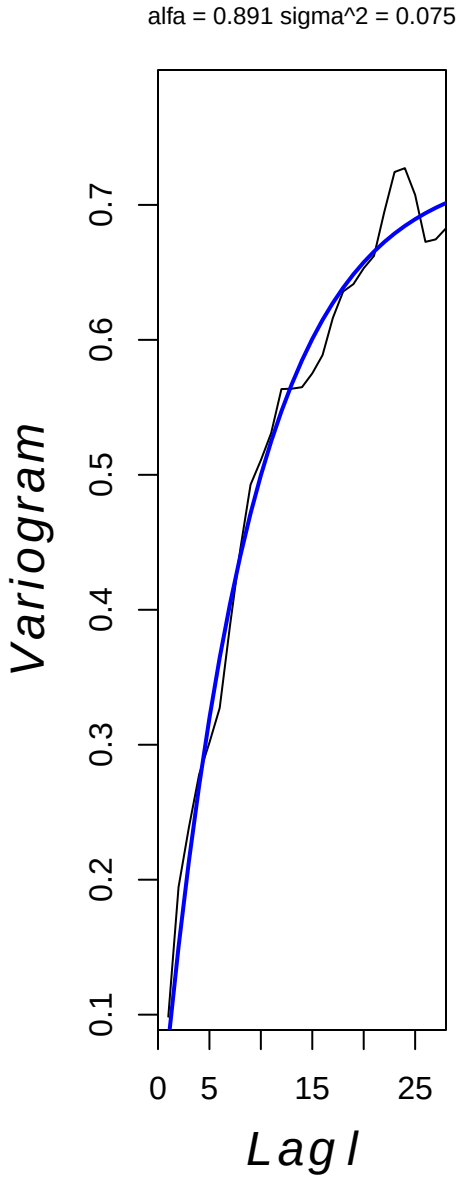

film12
Variogram
0.0
0.2
0.4
0.6
0.8
1.0
0
40
80
Lag l

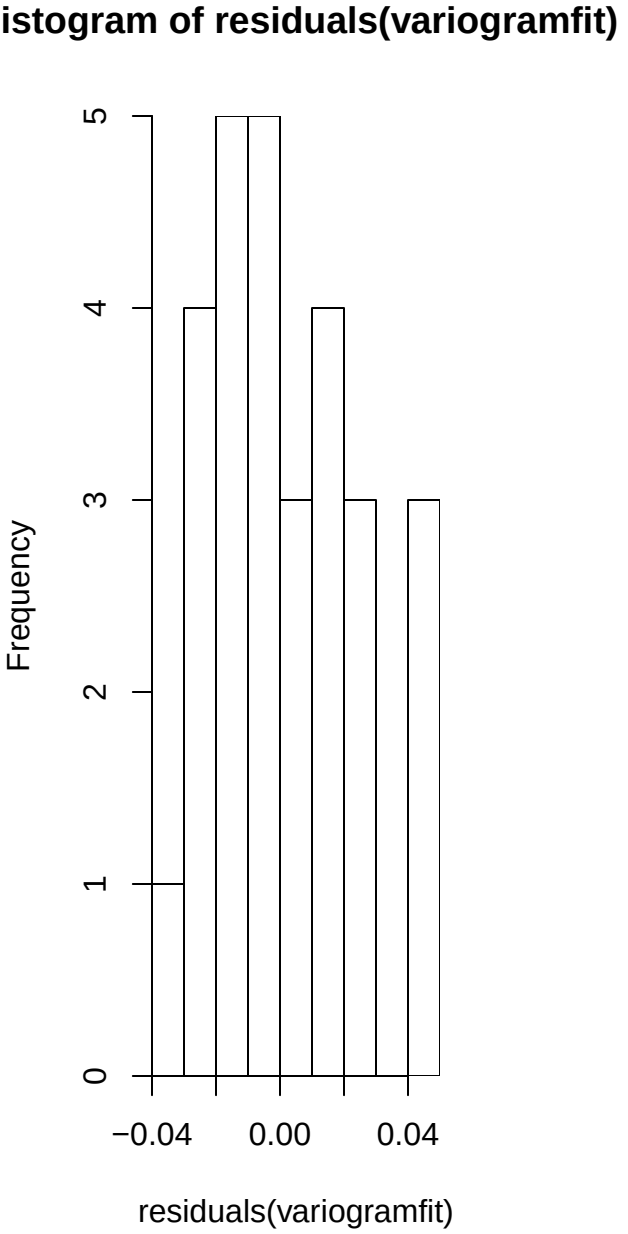

T(s) = 179.6 alfa = 0.658 sigma^2 = 0.036
Variogram
0.2
0.4
0.6
0.8
0
20
40
Lag l

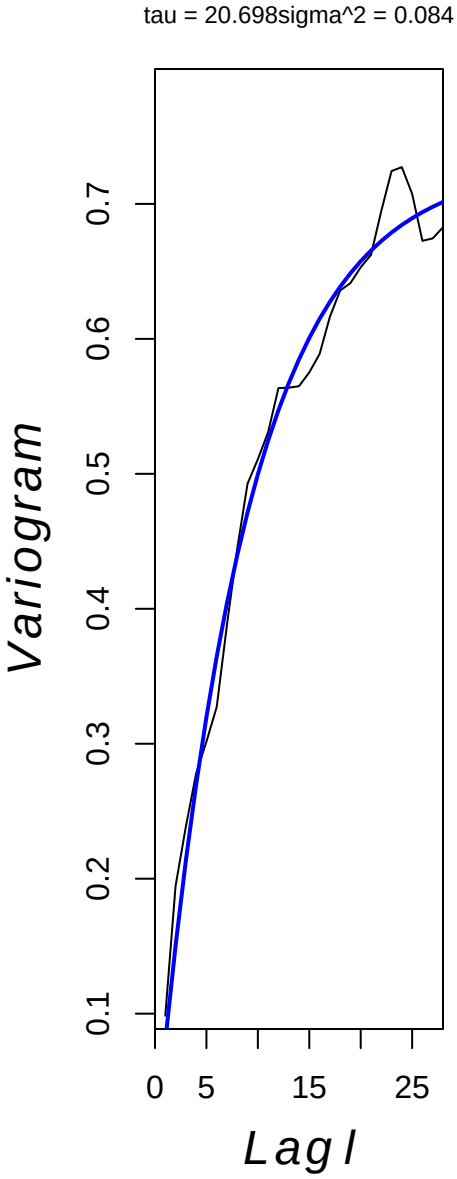

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
−0.2
0.0
0.2
residuals(variogramfit)

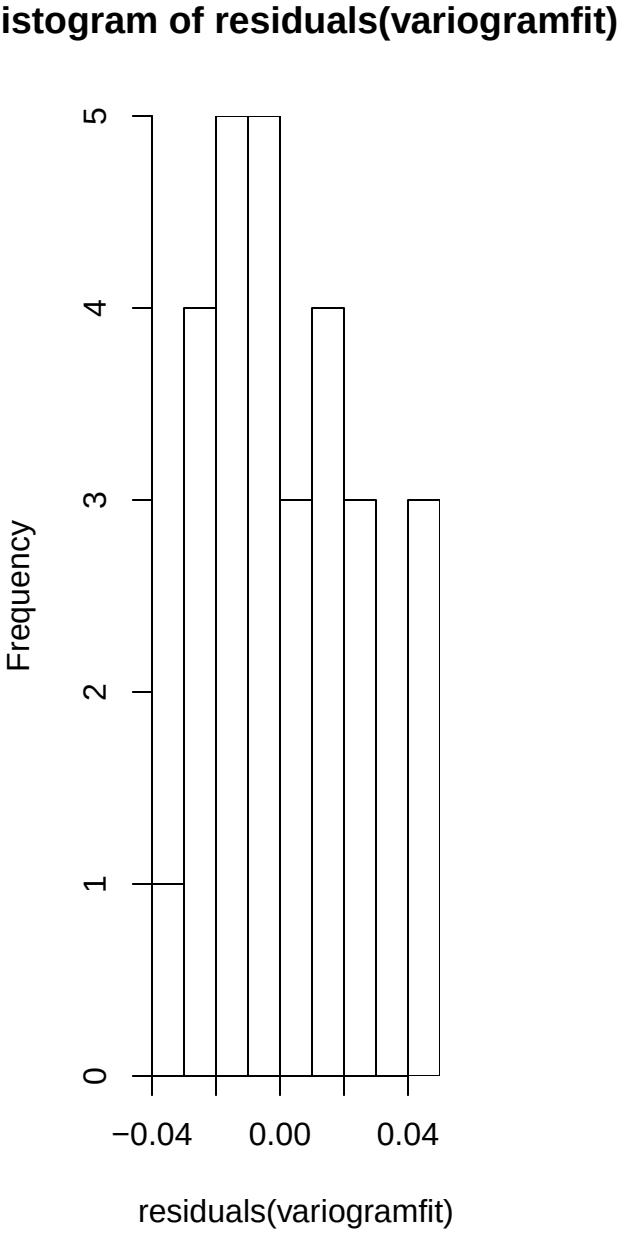

T(s) = 178.1 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.2
0.4
0.6
0.8
0
20
40
Lag l

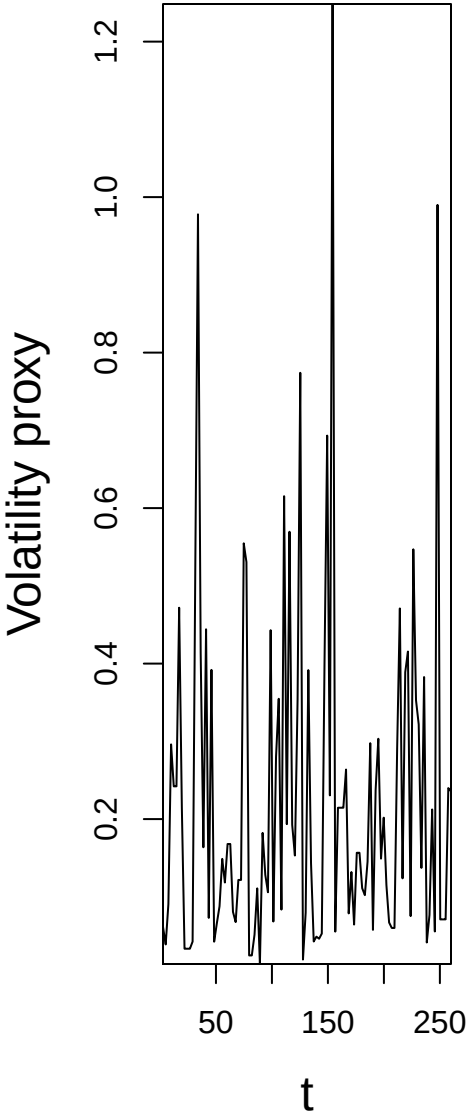

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
12
−0.2
0.0
0.2
0.4
residuals(variogramfit)

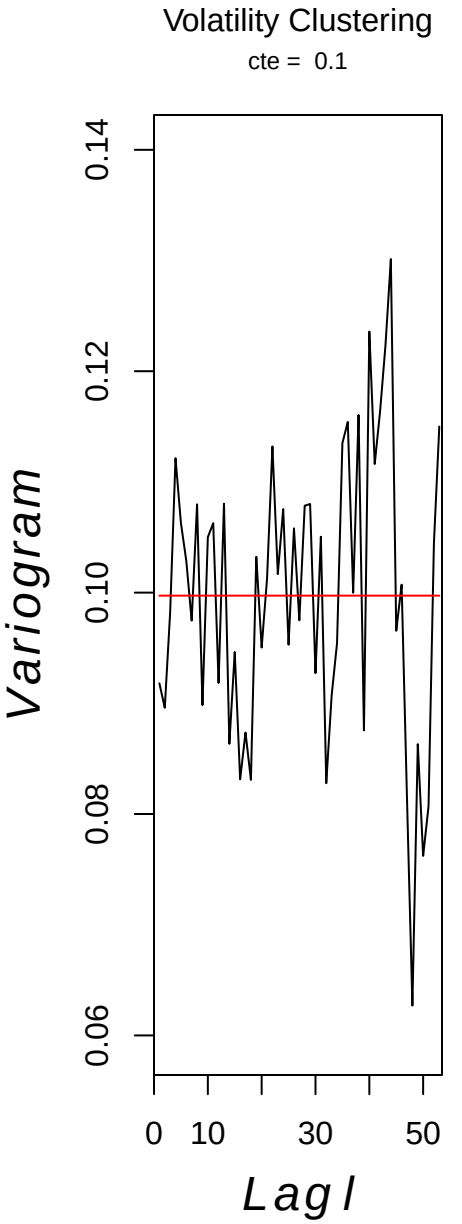

alfa = 0.891 sigma^2 = 0.075
Variogram
Lag l
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0
5
15
25

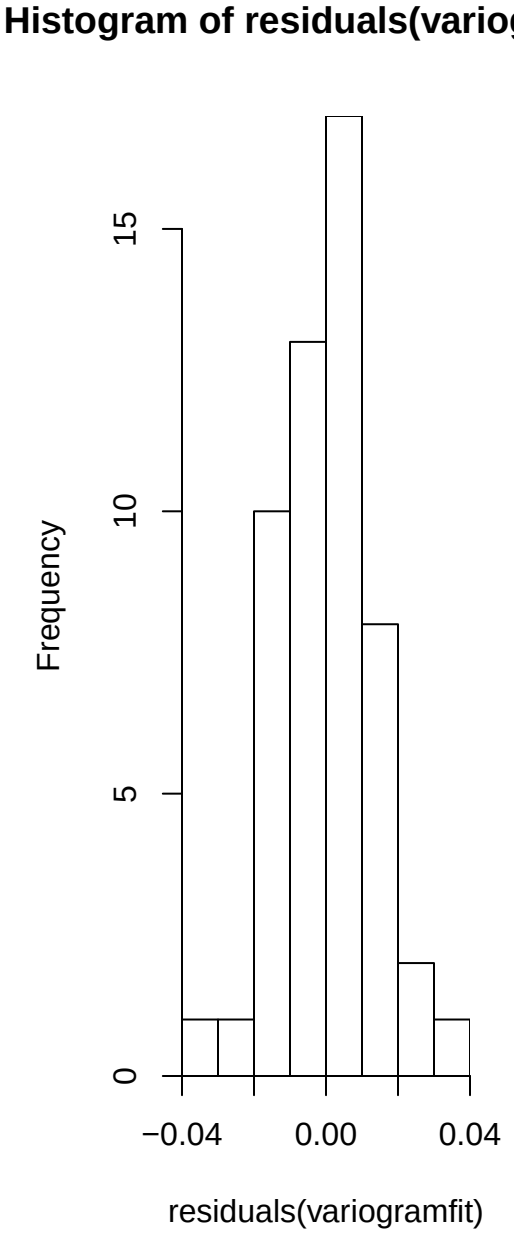

Histogram of residuals(variogramfit)
Frequency
residuals(variogramfit)
0
1
2
3
4
5
−0.04
0.00
0.04

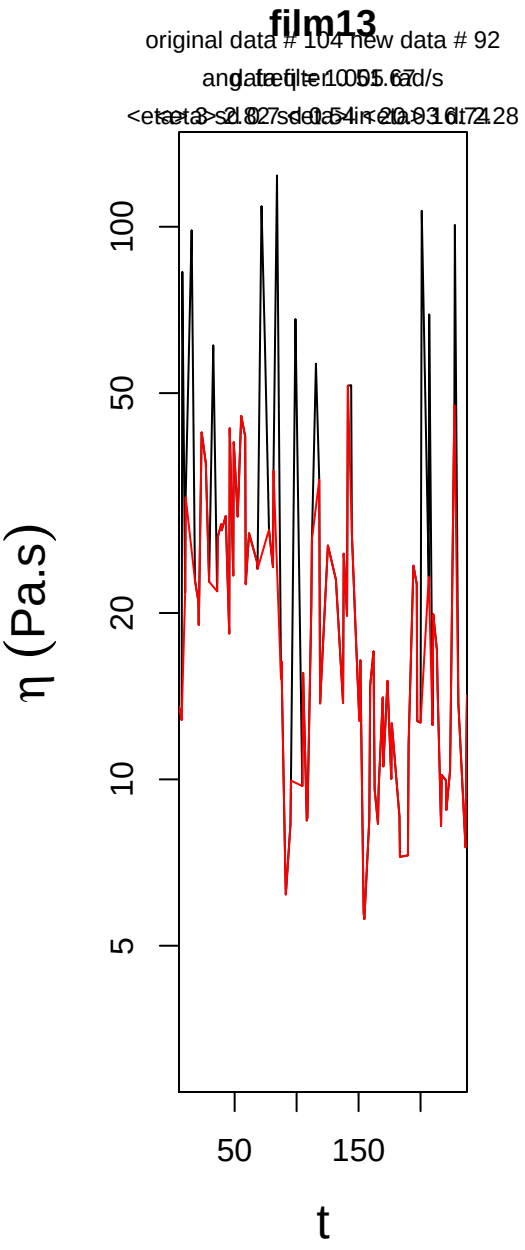

tau = 20.698sigma^2 = 0.084
Variogram
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0
5
15
25
Lag l

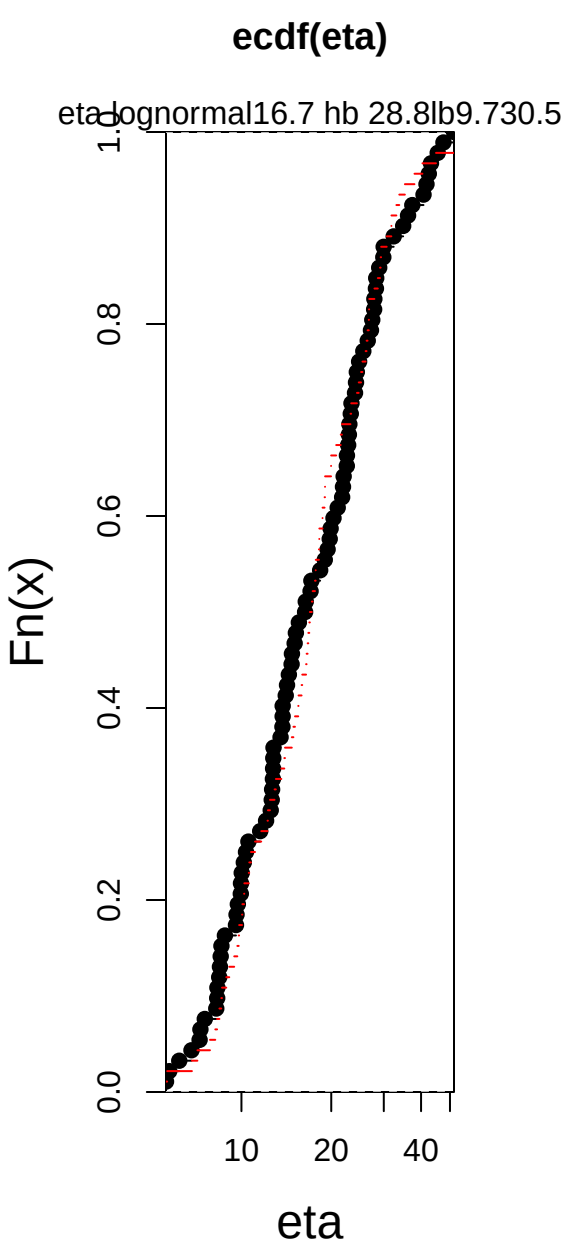

Histogram of residuals(variogramfit)
Frequency
0
1
2
3
4
5
−0.04
0.00
0.04
residuals(variogramfit)

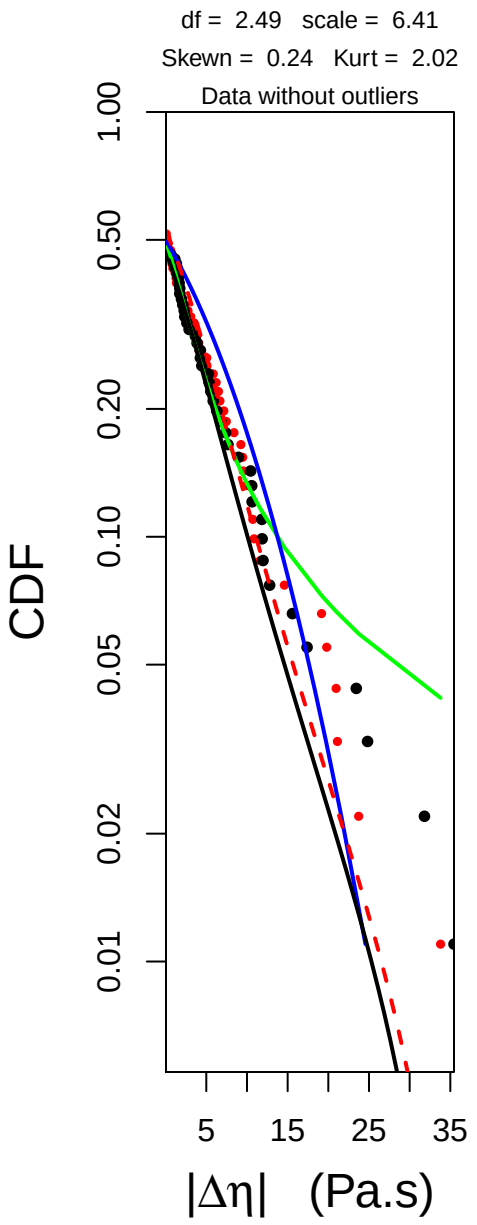

Volatility proxy
0.2
0.4
0.6
0.8
1.0
1.2
50
150
250
t

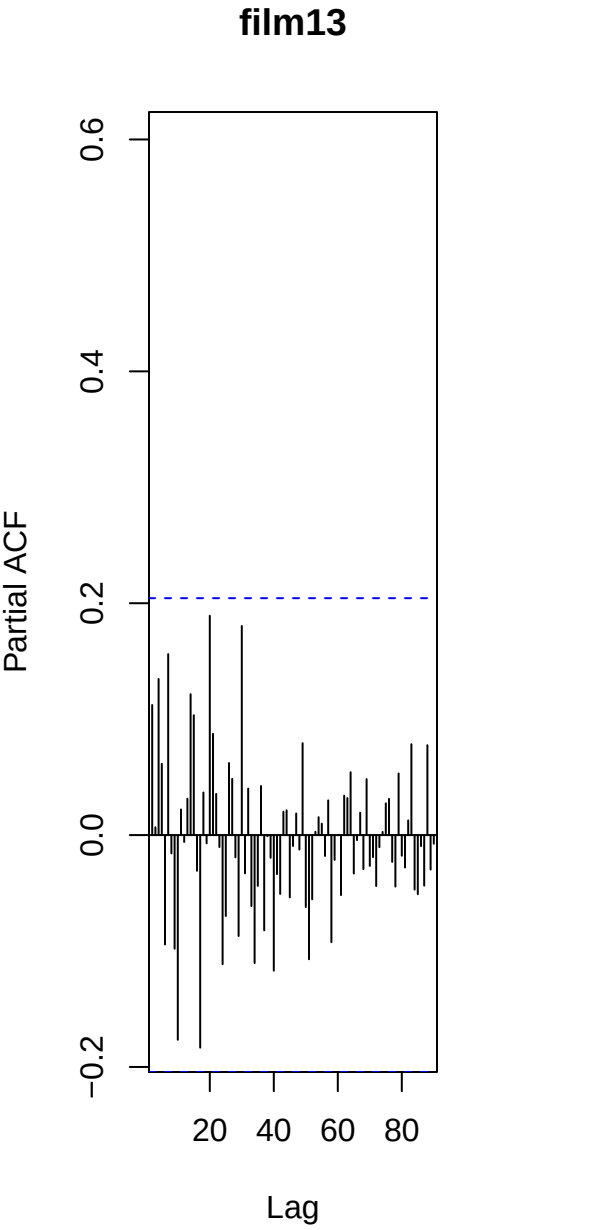

Volatility Clustering
cte = 0.1
Variogram
0.06
0.08
0.10
0.12
0.14
0
10
30
50
Lag l

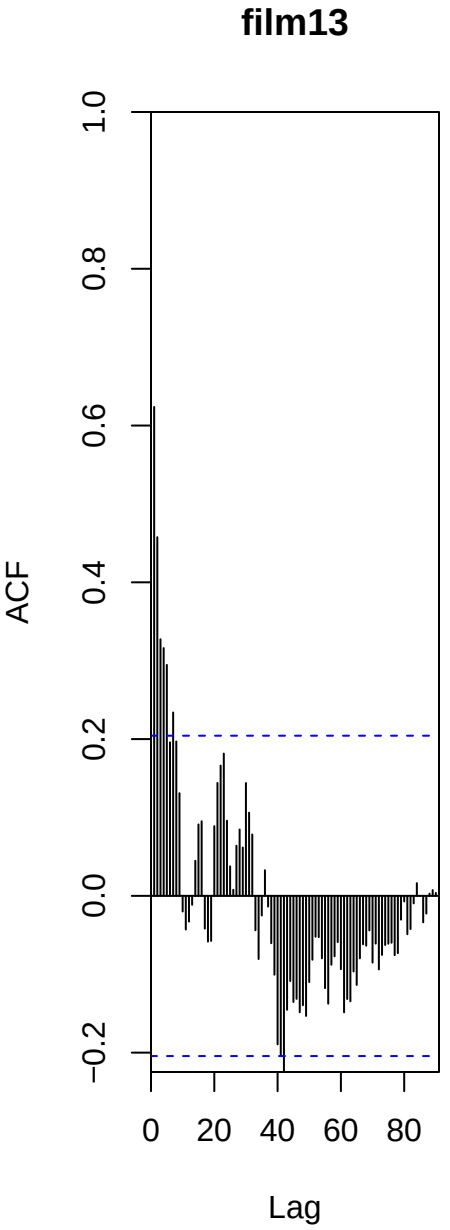

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
−0.04
0.00
0.04
residuals(variogramfit)

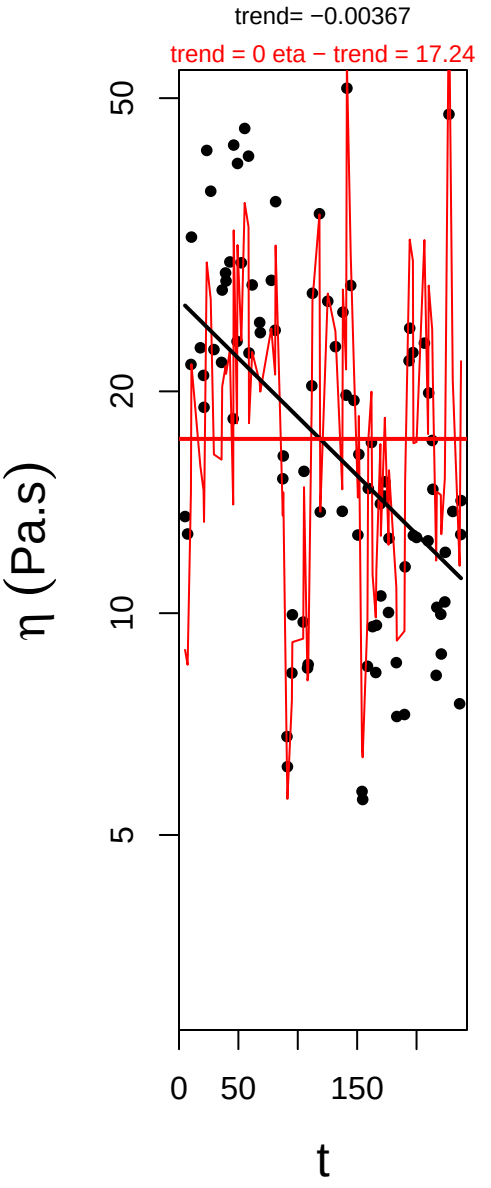

film13
original data # 104 new data # 92
η (Pa.s)
t

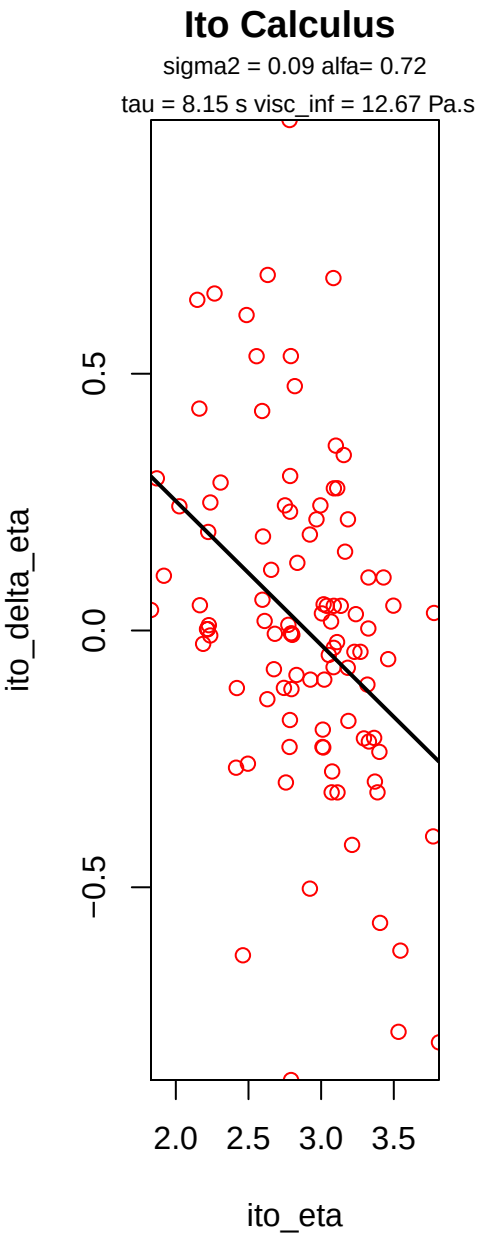

ecdf(eta)
eta lognormal16.7 hb 28.8lb9.730.5
Fn(x)
eta

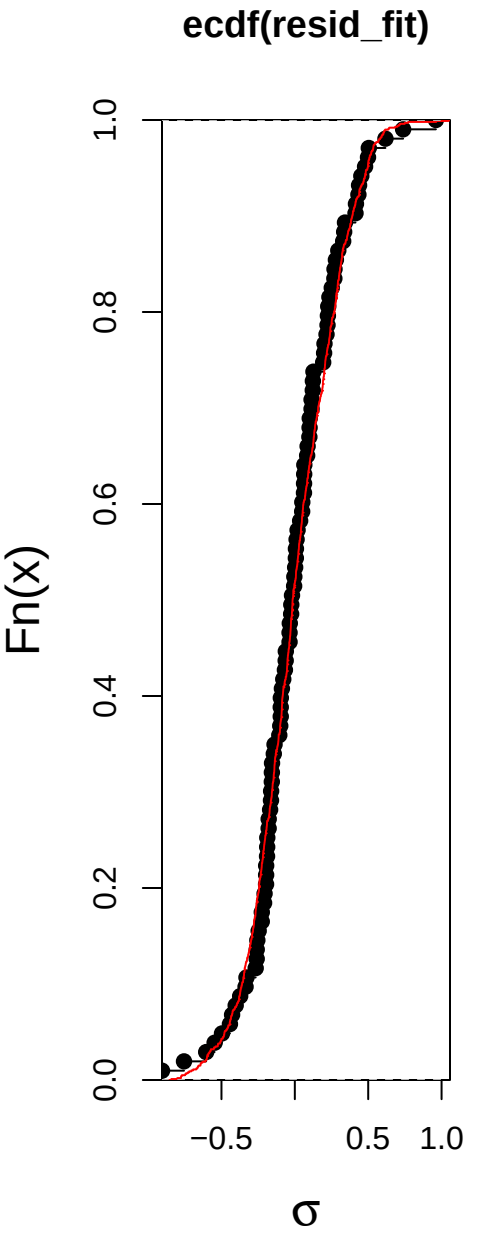

df = 2.49 scale = 6.41
Skewn = 0.24 Kurt = 2.02
Data without outliers
CDF
1.00
0.50
0.20
0.10
0.05
0.02
0.01
5
15
25
35
|Δη| (Pa.s)

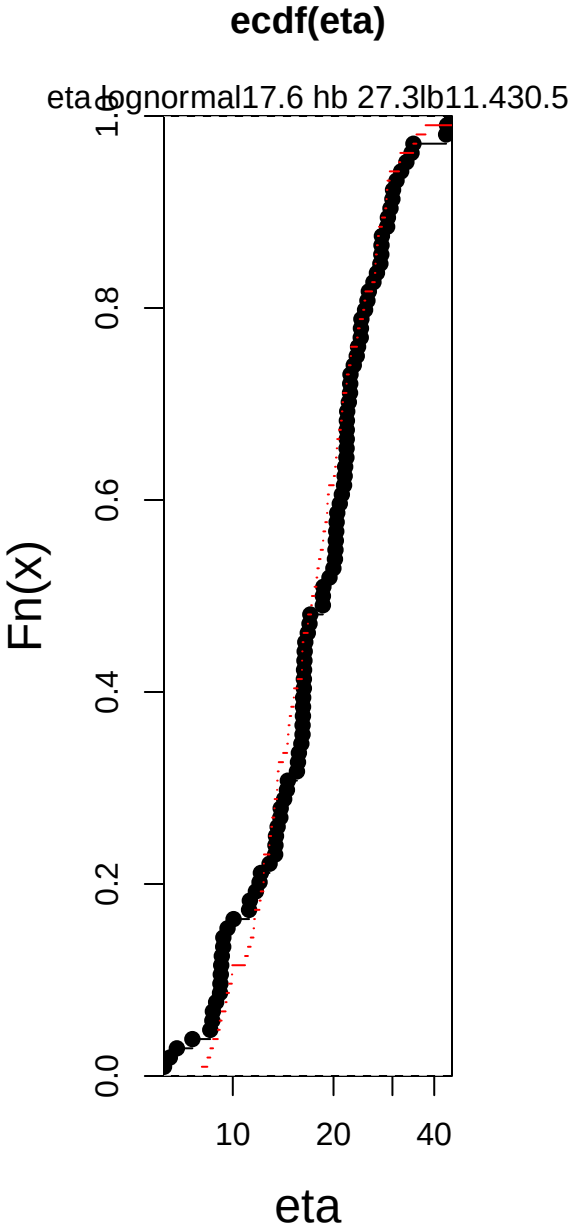

film13
Partial ACF
0.6
0.4
0.2
0.0
−0.2
20
40
60
80
Lag

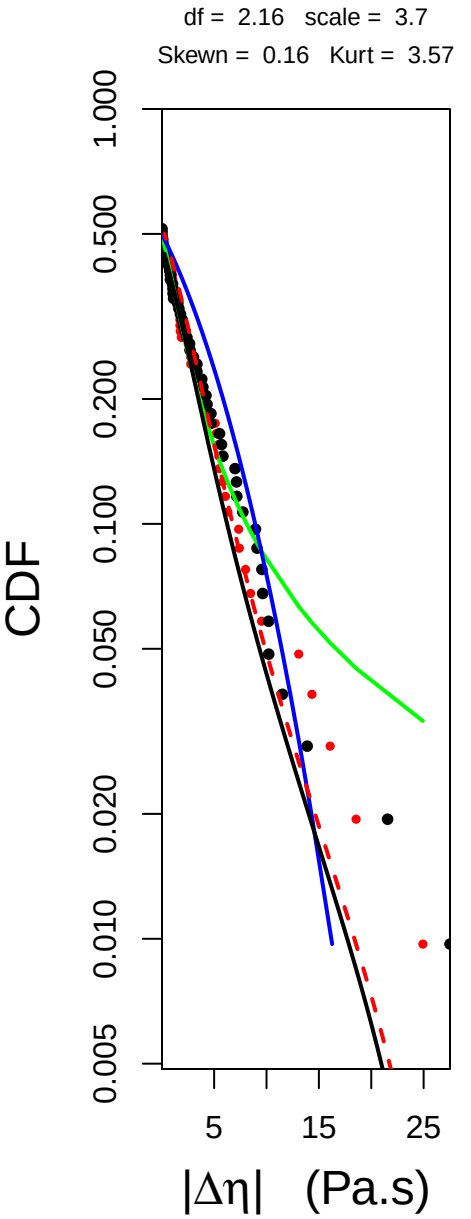

film13
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
20
40
60
80
Lag


trend= −0.00367
trend = 0 eta − trend = 17.24
η (Pa.s)
50
20
10
5
0
50
150
t

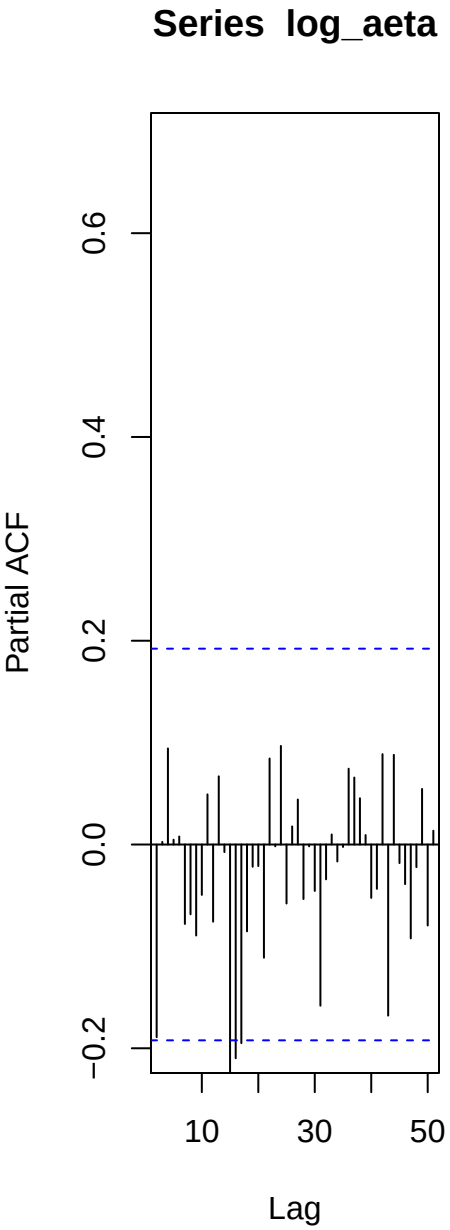

Ito Calculus
sigma2 = 0.09 alfa= 0.72
tau = 8.15 s visc_inf = 12.67 Pa.s
ito_delta_eta
0.5
0.0
−0.5
2.0
2.5
3.0
3.5
ito_eta

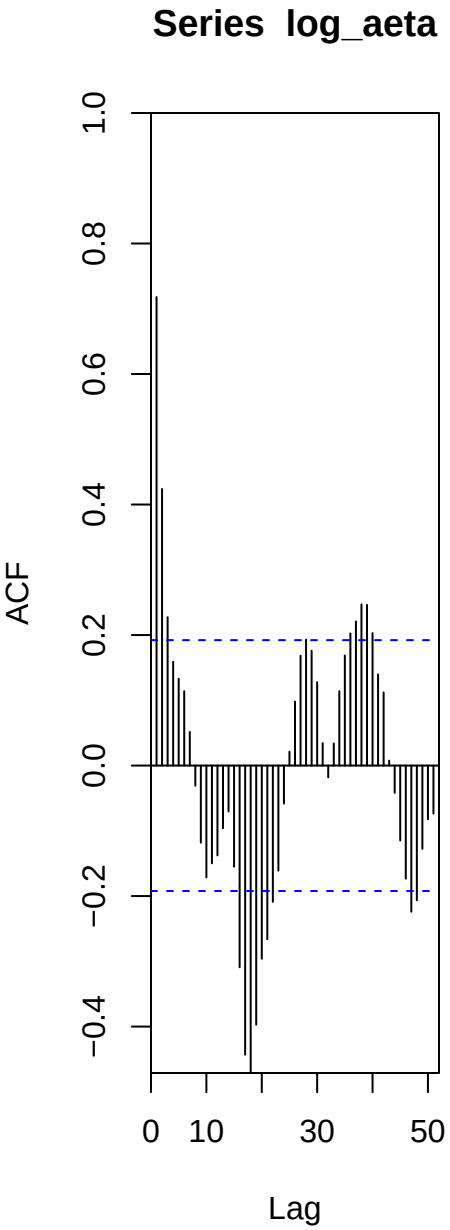

ecdf(resid_fit)
Fn(x)
0.0
0.2
0.4
0.6
0.8
1.0
−0.5
0.5
1.0
σ

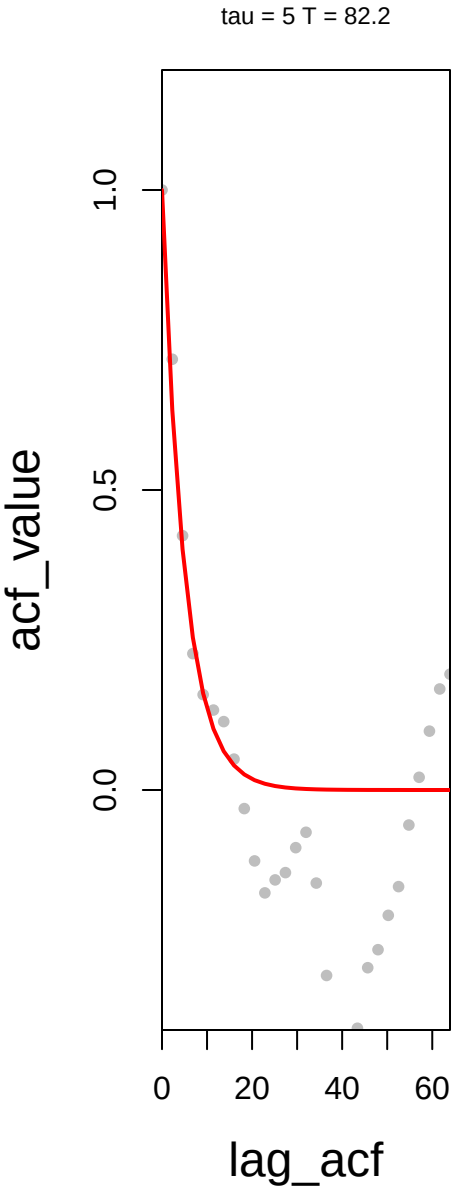


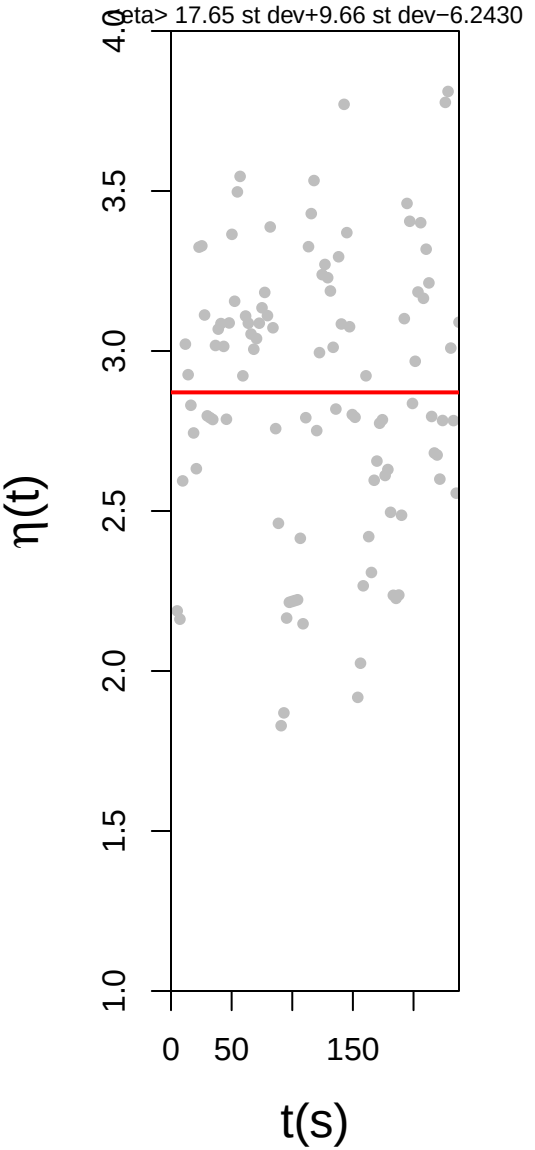


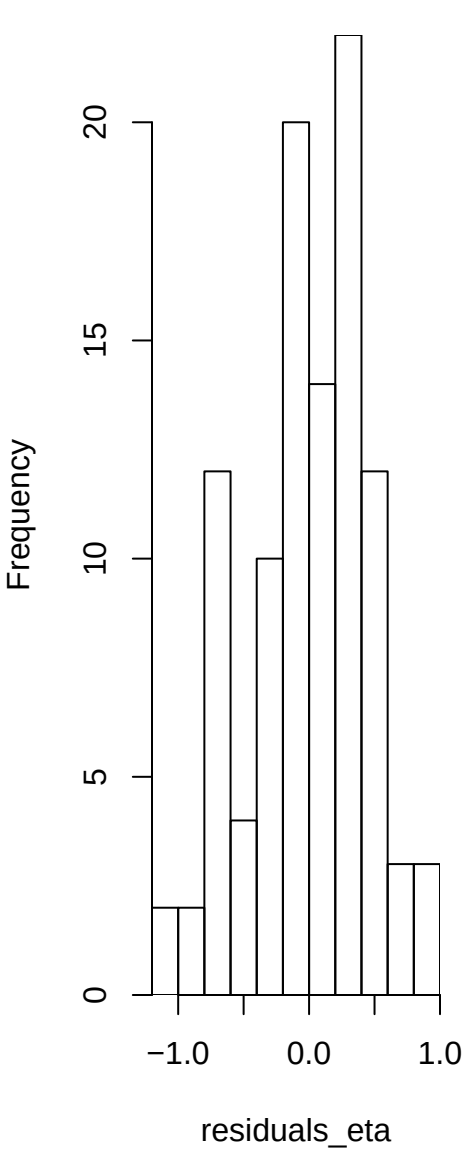
riginal data #

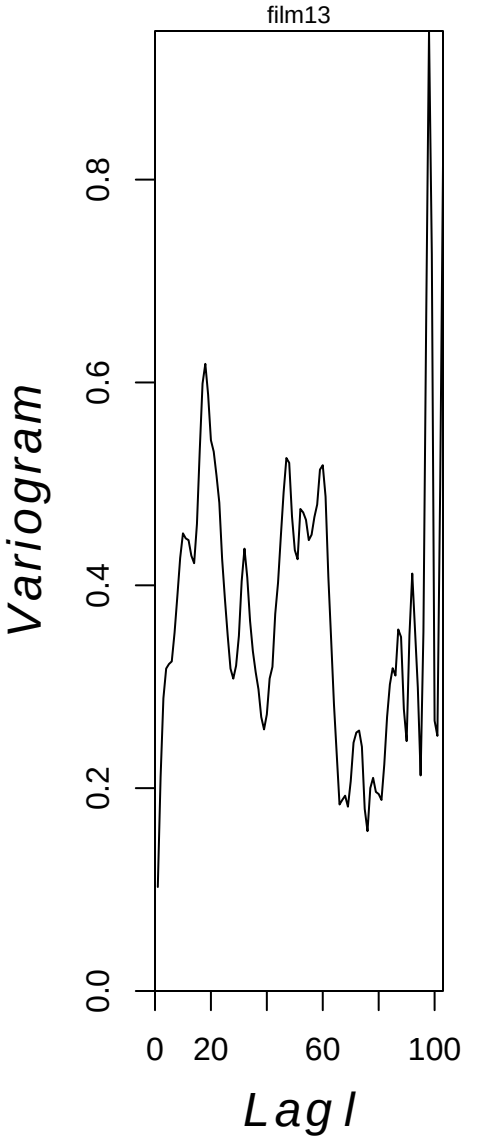

Series log_aeta
Partial ACF
0.6
0.4
0.2
0.0
−0.2
10
30
50
Lag

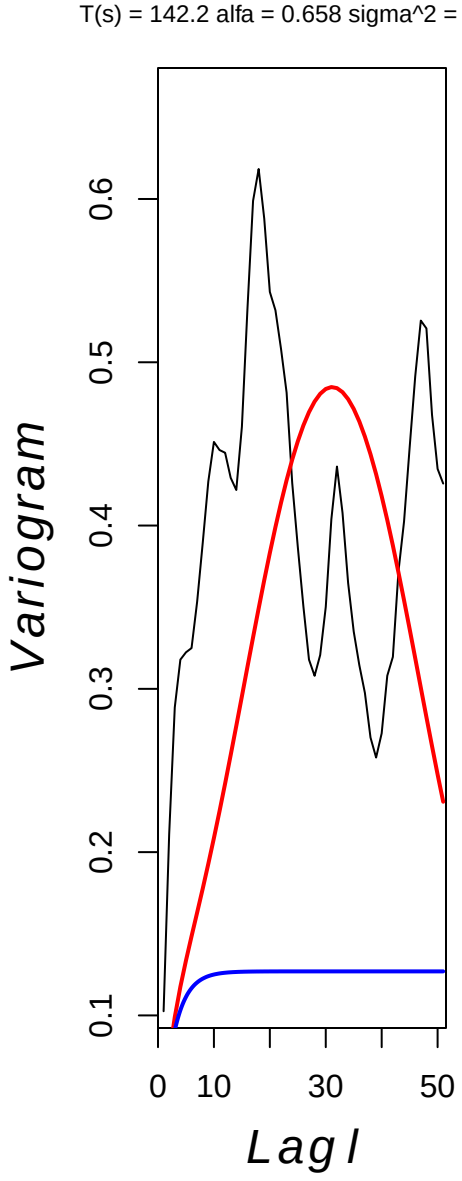

Series log_aeta
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
0
10
30
50
Lag

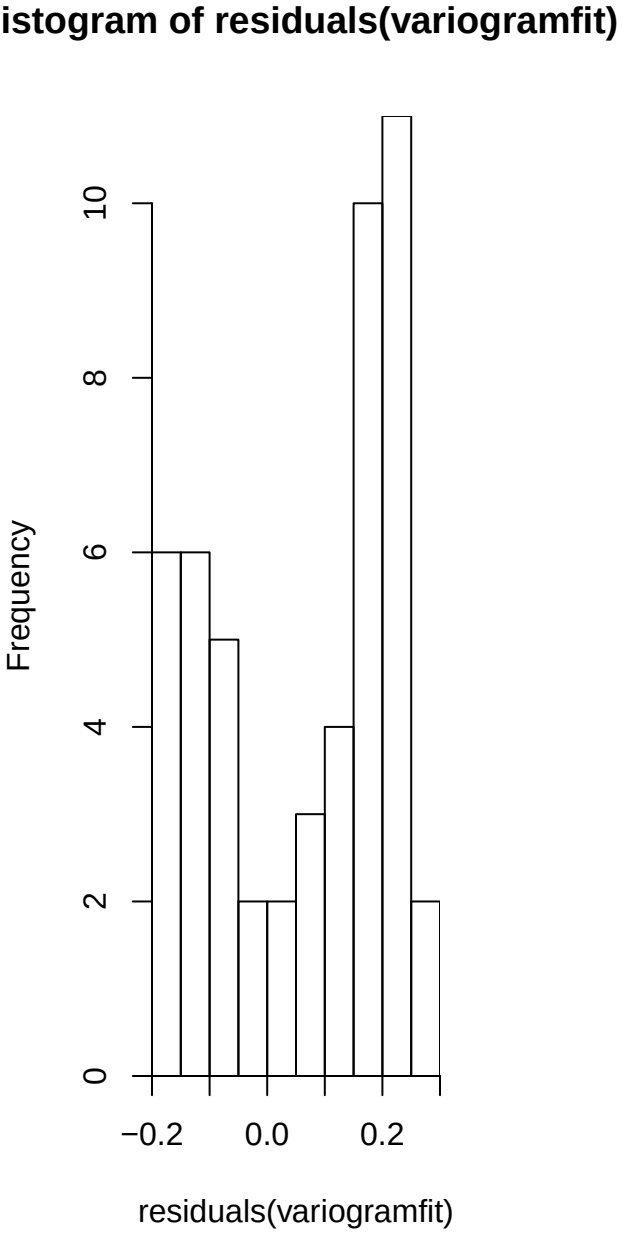

tau = 5 T = 82.2
acf_value
1.0
0.5
0.0
0
20
40
60
lag_acf

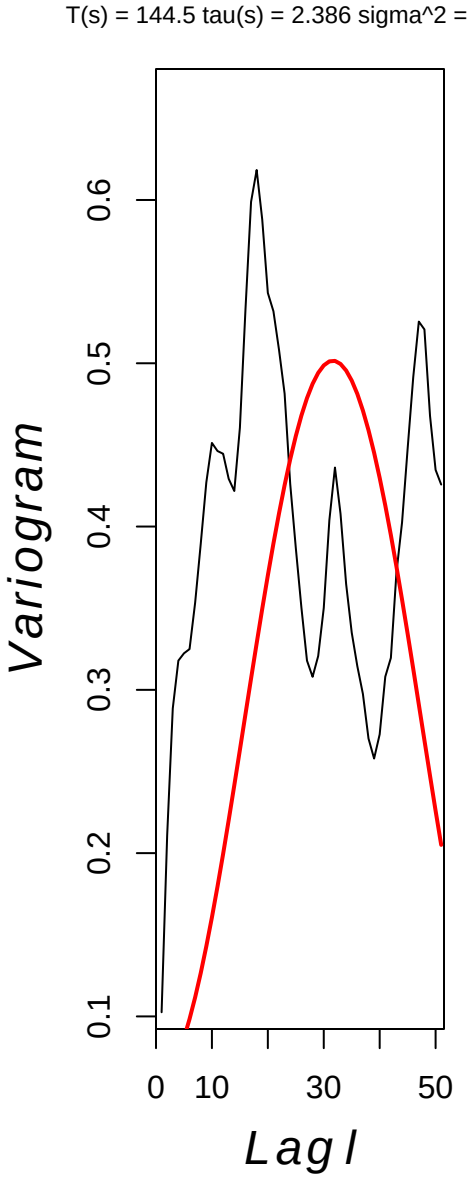

eta> 17.65 st dev+9.66 st dev−6.2430
η(t)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0
50
150
t(s)

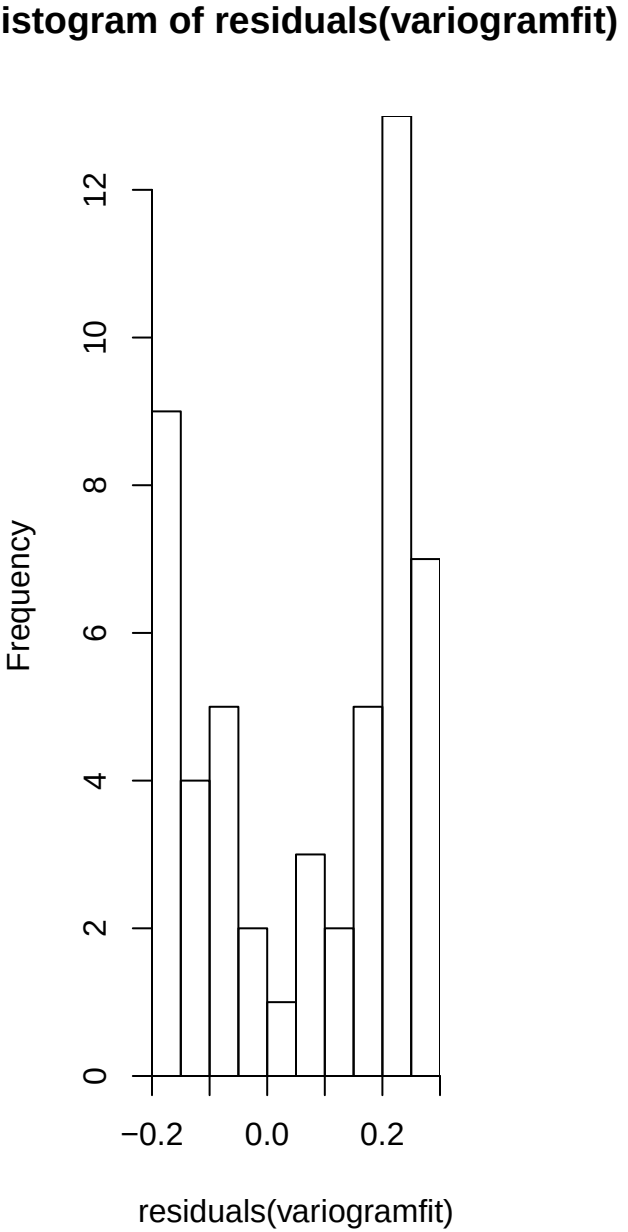

Histogram of residuals_eta
Frequency
0
5
10
15
20
−1.0
0.0
1.0
residuals_eta

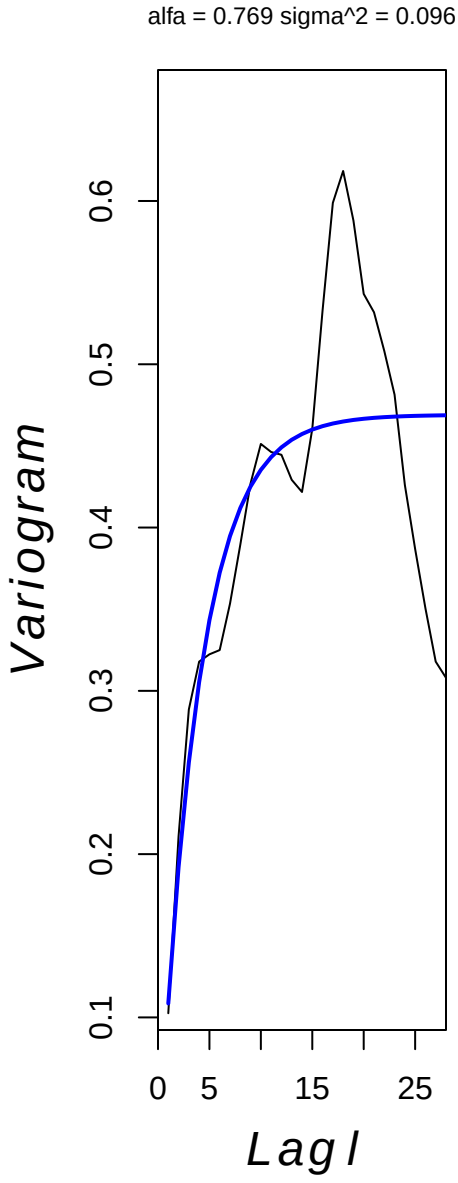

film13
Variogram
0.0
0.2
0.4
0.6
0.8
0
20
60
100
Lag l

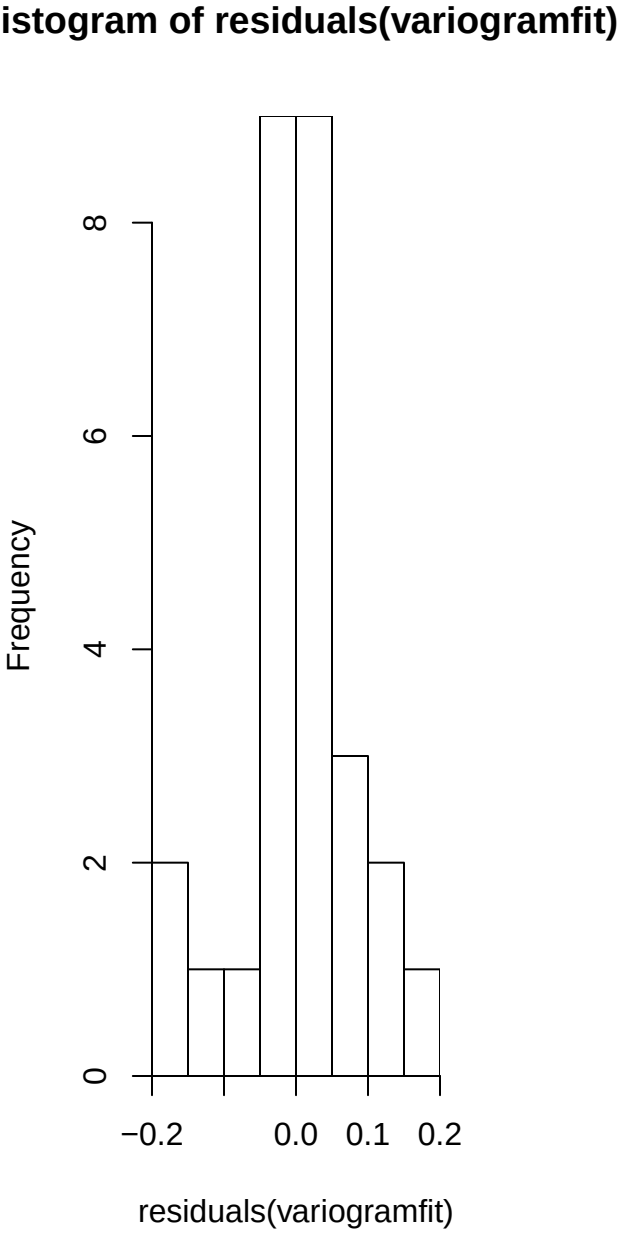

T(s) = 142.2 alfa = 0.658 sigma^2 = 0.036
Variogram
0.1
0.2
0.3
0.4
0.5
0.6
0
10
30
50
Lag l

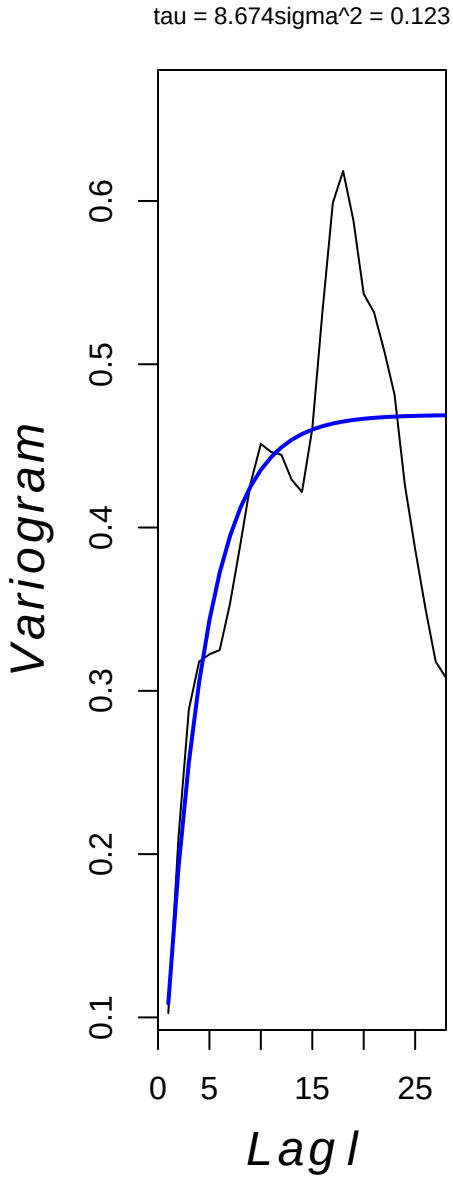

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
−0.2
0.0
0.2
residuals(variogramfit)

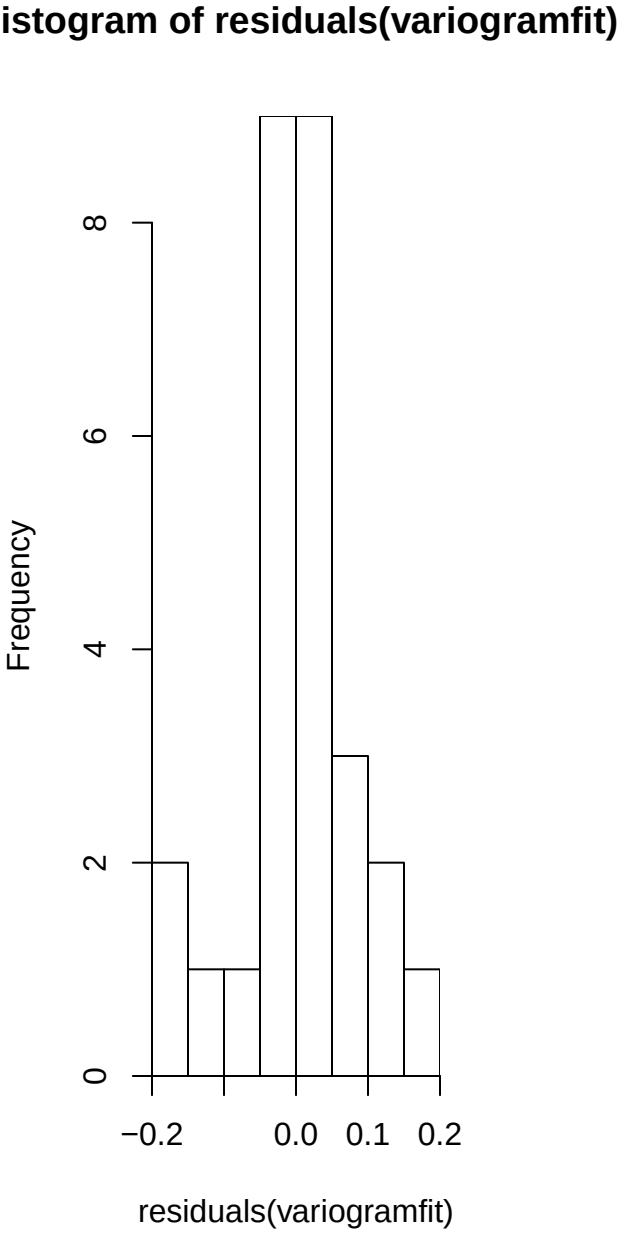

T(s) = 144.5 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.1
0.2
0.3
0.4
0.5
0.6
0
10
30
50
Lag l

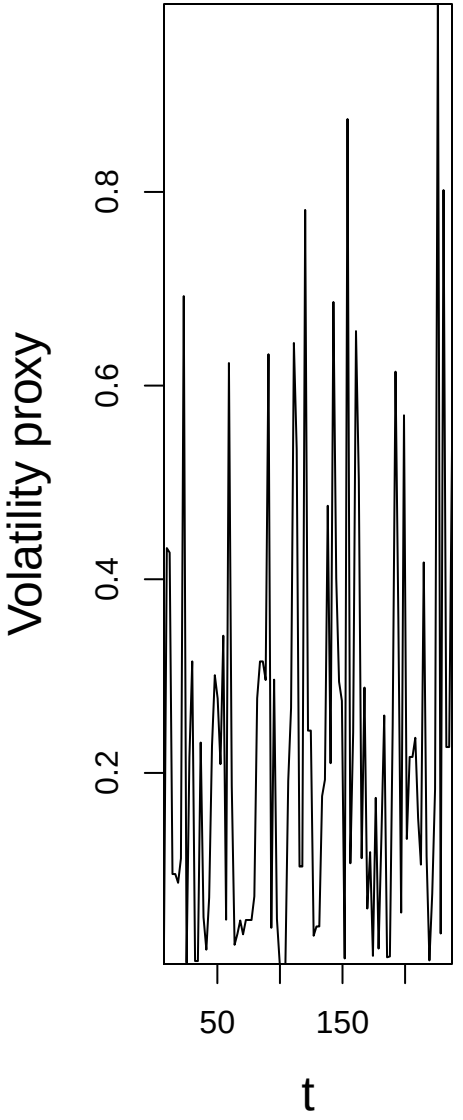

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
12
−0.2
0.0
0.2
residuals(variogramfit)

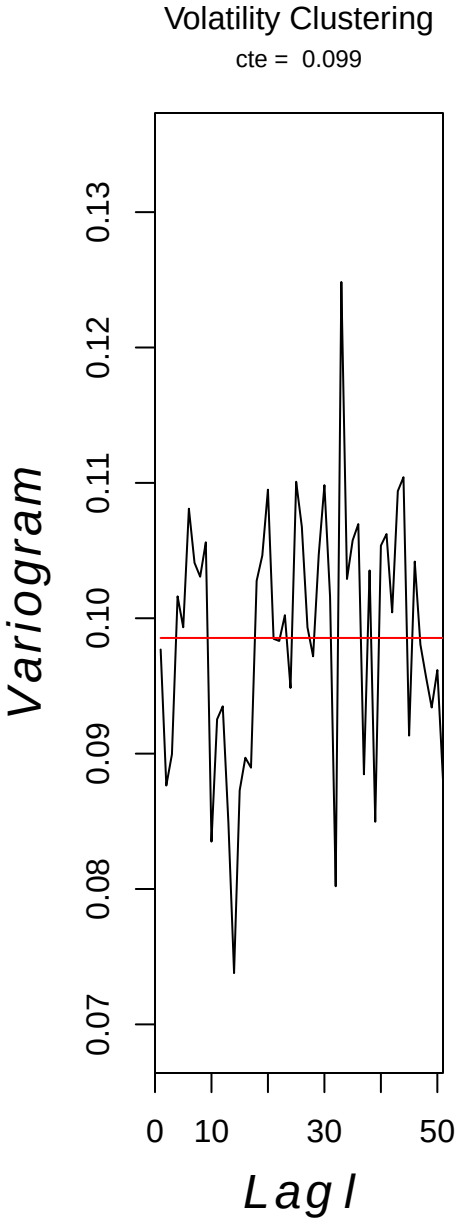

alfa = 0.769 sigma^2 = 0.096
Variogram
Lag l
0.1
0.2
0.3
0.4
0.5
0.6
0
5
15
25

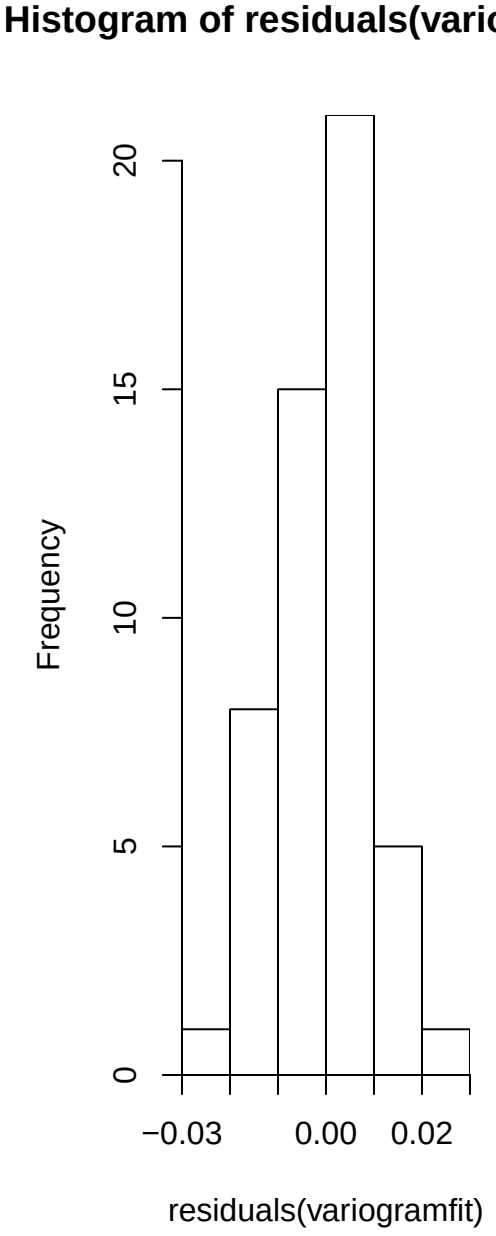

Histogram of residuals(variogramfit)
Frequency
residuals(variogramfit)
0
2
4
6
8
−0.2
0.0
0.1
0.2

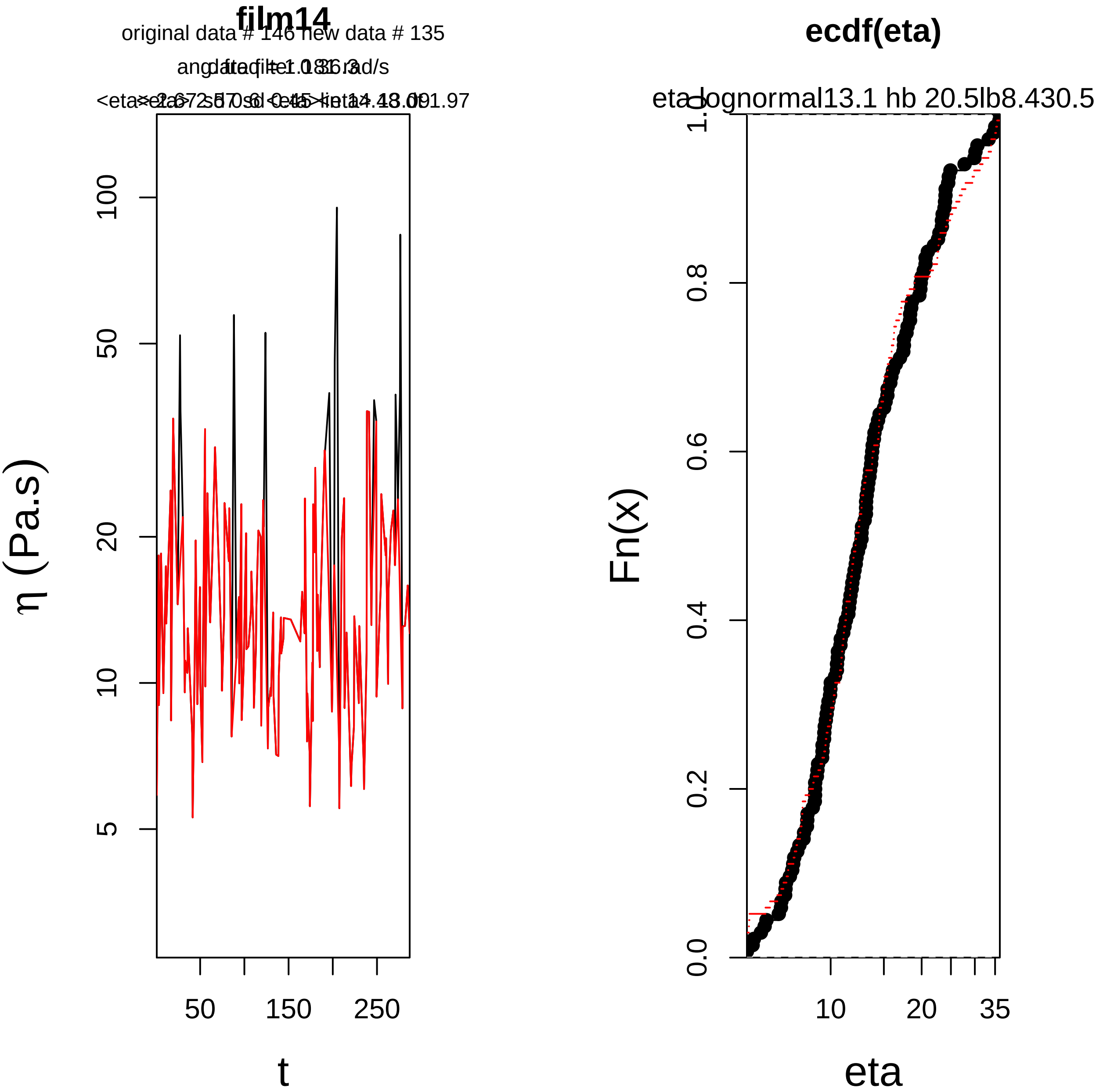

tau = 8.674sigma^2 = 0.123
Variogram
0.1
0.2
0.3
0.4
0.5
0.6
0
5
15
25
Lag l

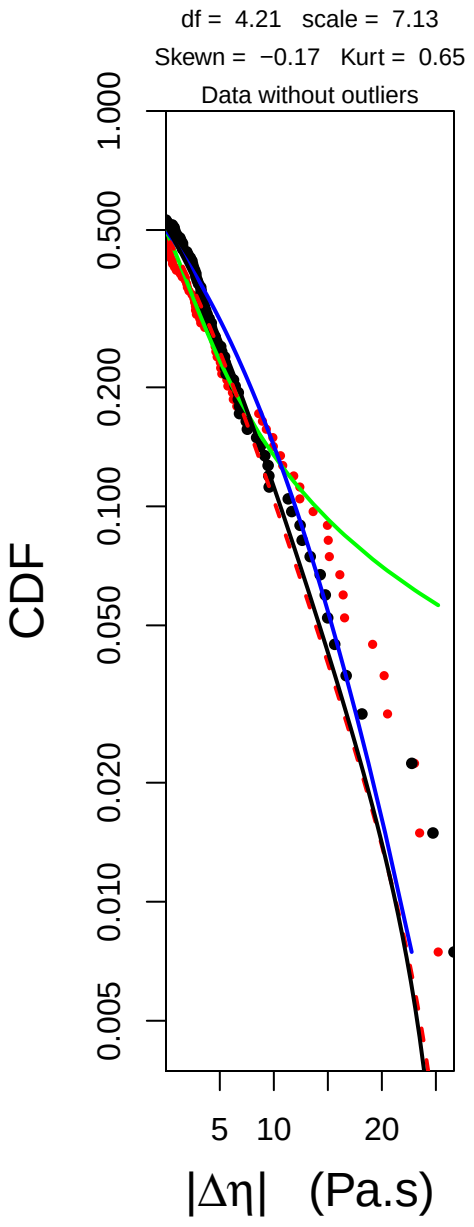

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
−0.2
0.0
0.1
0.2
residuals(variogramfit)

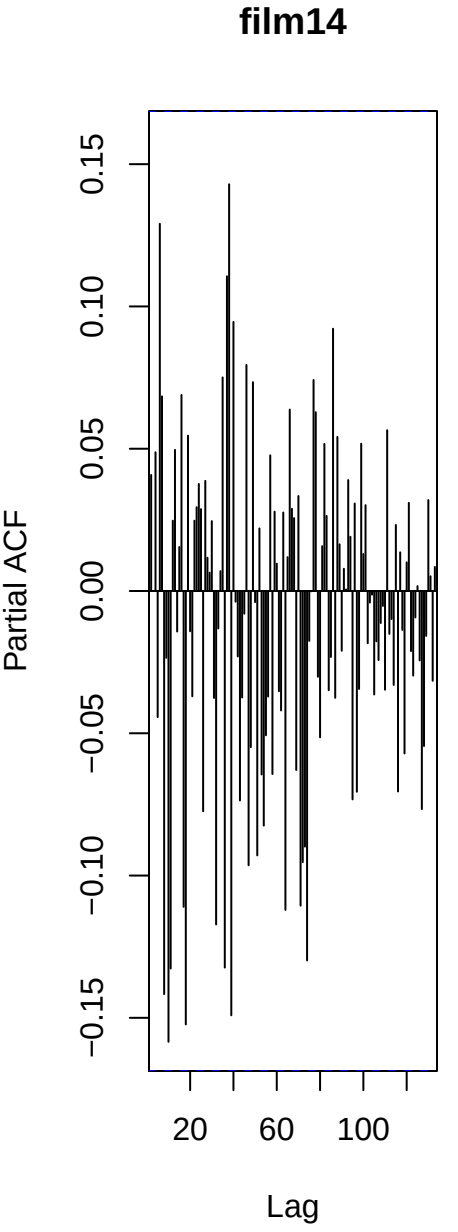

Volatility proxy
0.2
0.4
0.6
0.8
50
150
t

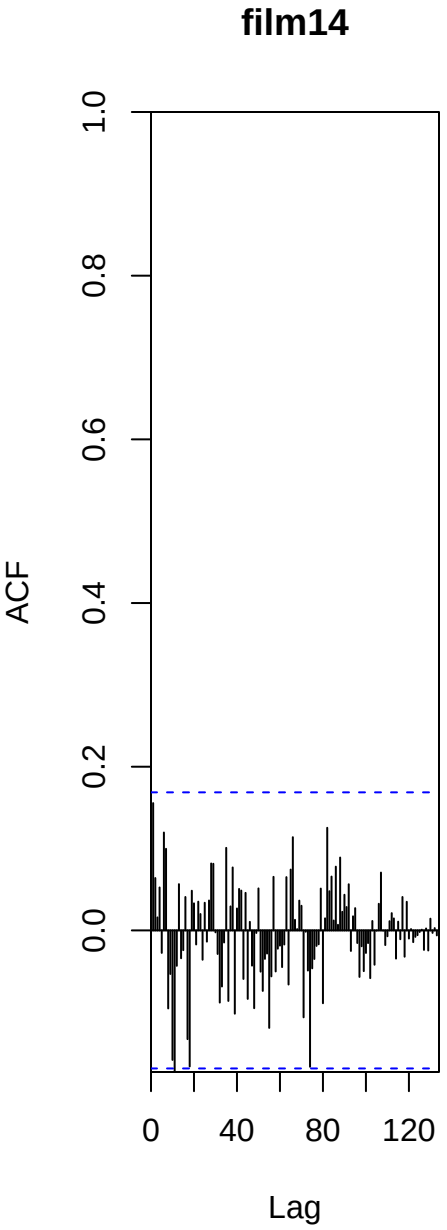

Volatility Clustering
cte = 0.099
Variogram
0.07
0.08
0.09
0.10
0.11
0.12
0.13
0
10
30
50
Lag l

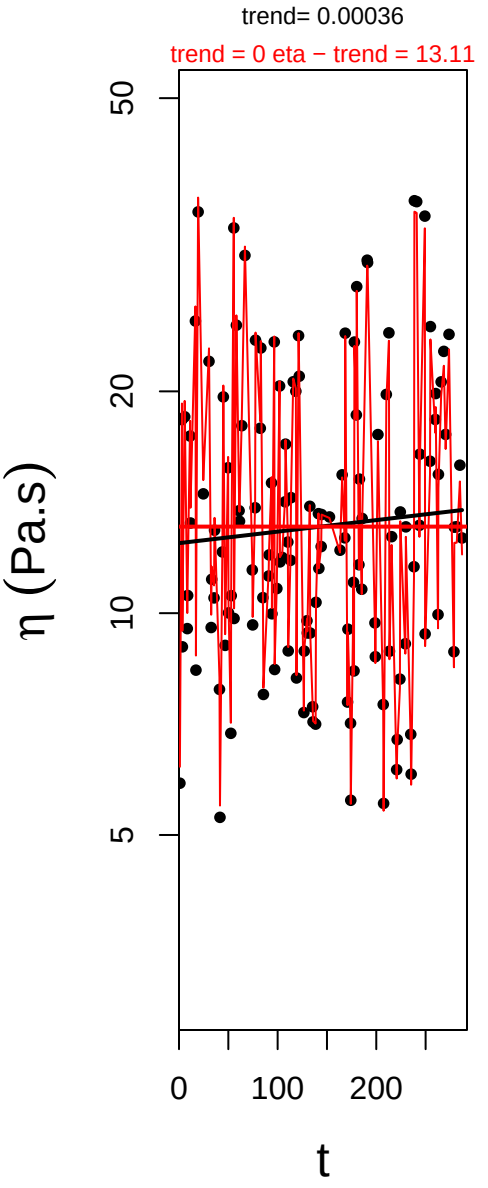

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
20
−0.03
0.00
0.02
residuals(variogramfit)

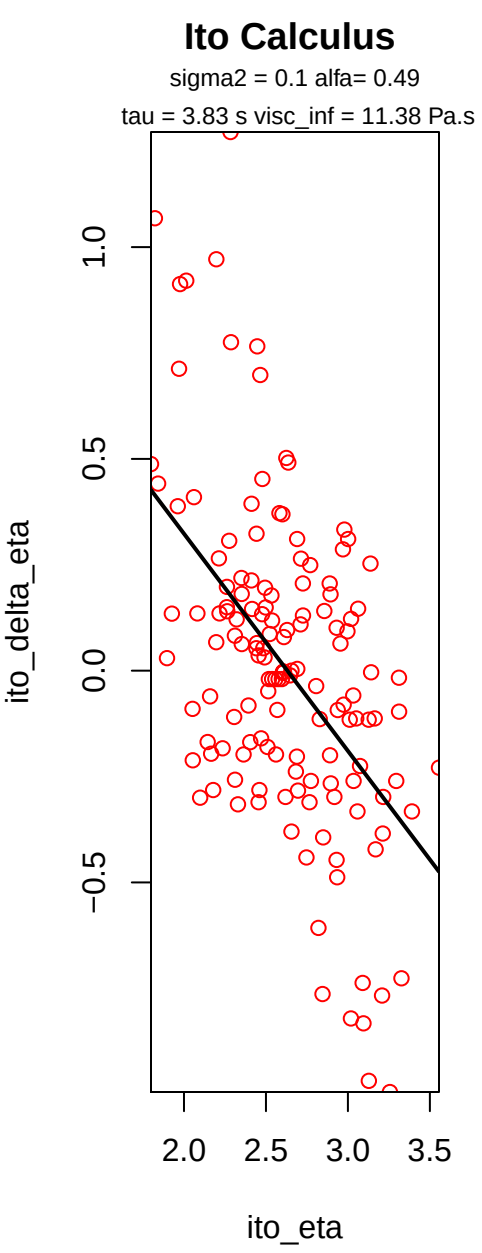

film14
original data # 146 new data # 135
η (Pa.s)
100
50
20
10
5
50
150
250
t
ecdf(eta)
eta lognormal13.1 hb 20.5lb8.430.5
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
10
20
35
eta

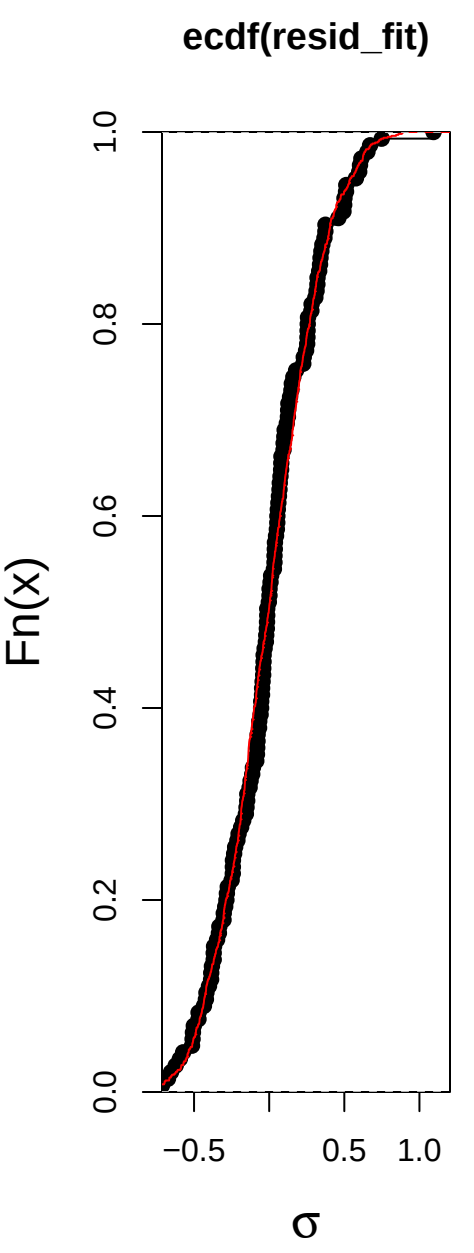

df = 4.21 scale = 7.13
Skewn = −0.17 Kurt = 0.65
Data without outliers
CDF
1.000
0.500
0.200
0.100
0.050
0.020
0.010
0.005
5
10
20
|Δη| (Pa.s)

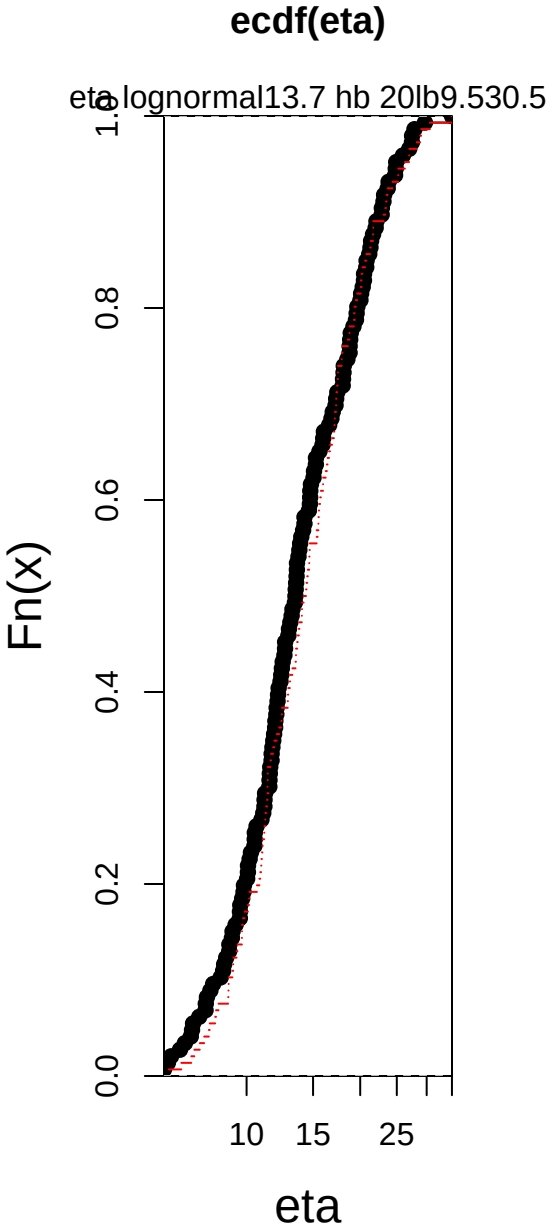

film14
Partial ACF
0.15
0.10
0.05
0.00
−0.05
−0.10
−0.15
20
60
100
Lag

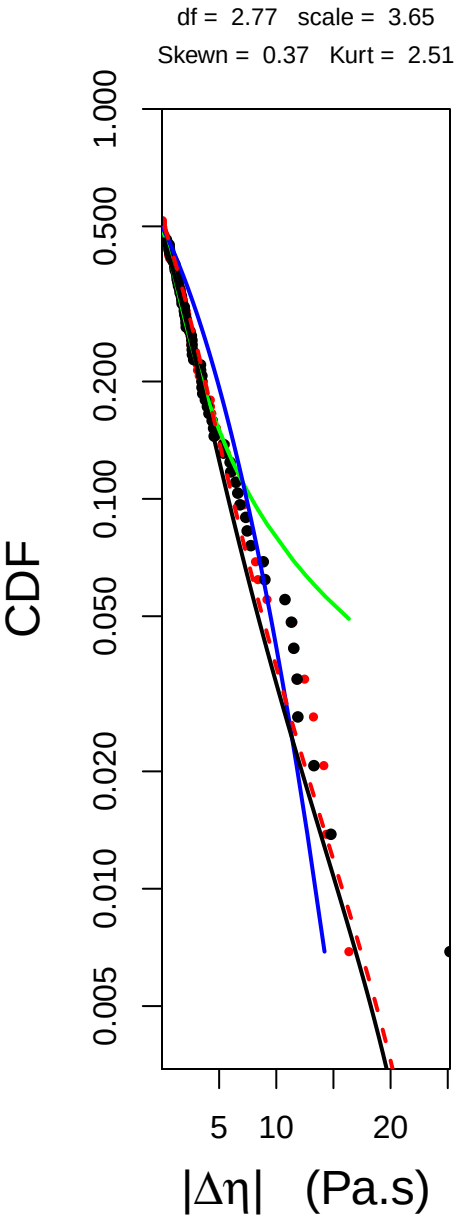

film14
ACF
1.0
0.8
0.6
0.4
0.2
0.0
0
40
80
120
Lag


trend= 0.00036
trend = 0 eta − trend = 13.11
η (Pa.s)
50
20
10
5
0
100
200
t

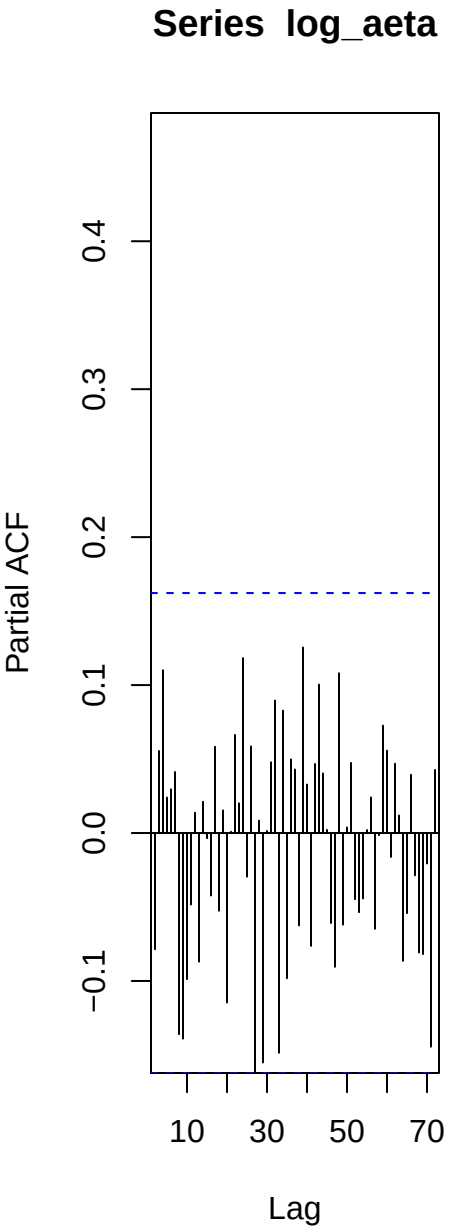

Ito Calculus
sigma2 = 0.1 alfa= 0.49
tau = 3.83 s visc_inf = 11.38 Pa.s
ito_delta_eta
1.0
0.5
0.0
−0.5
2.0
2.5
3.0
3.5
ito_eta

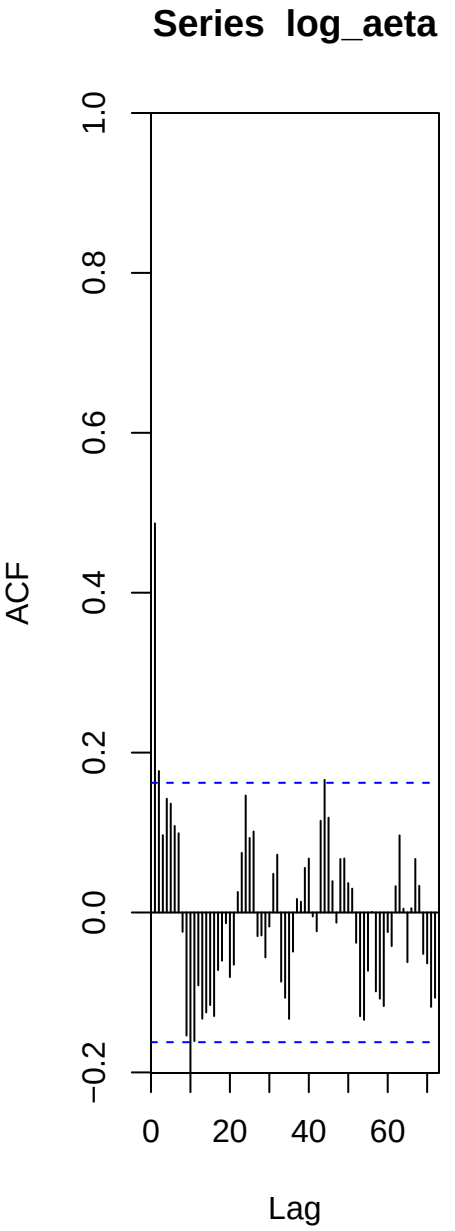

ecdf(resid_fit)
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
−0.5
0.5
1.0
σ

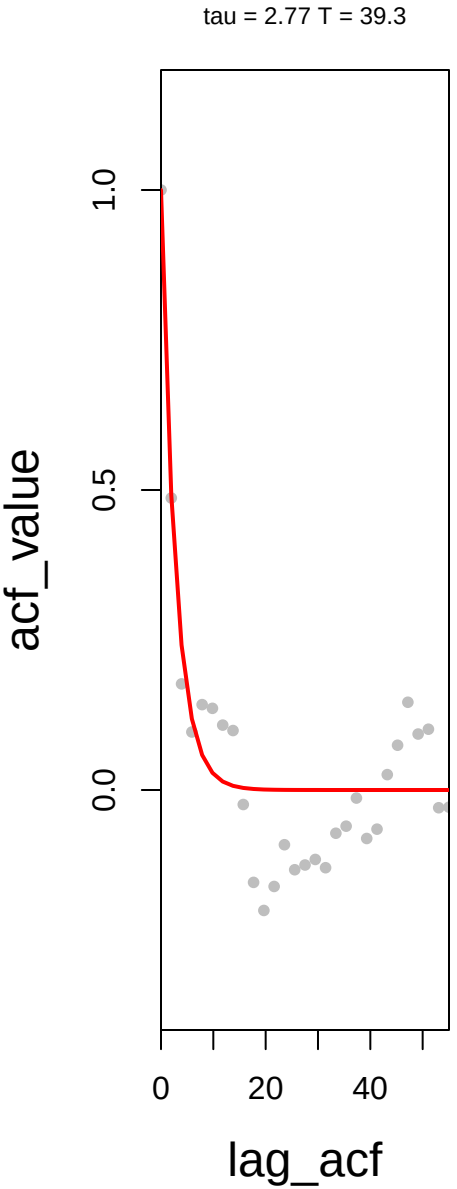


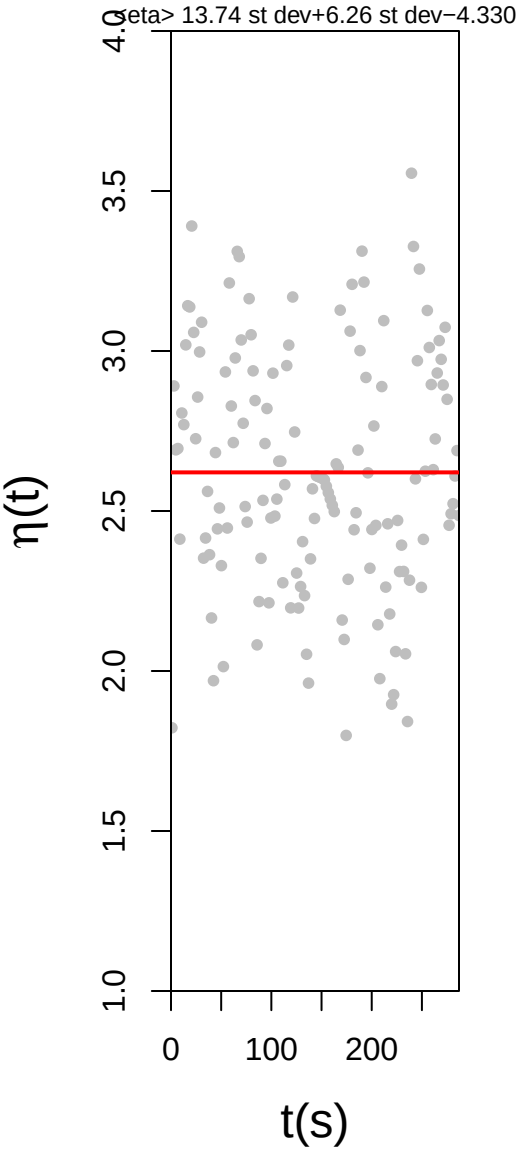


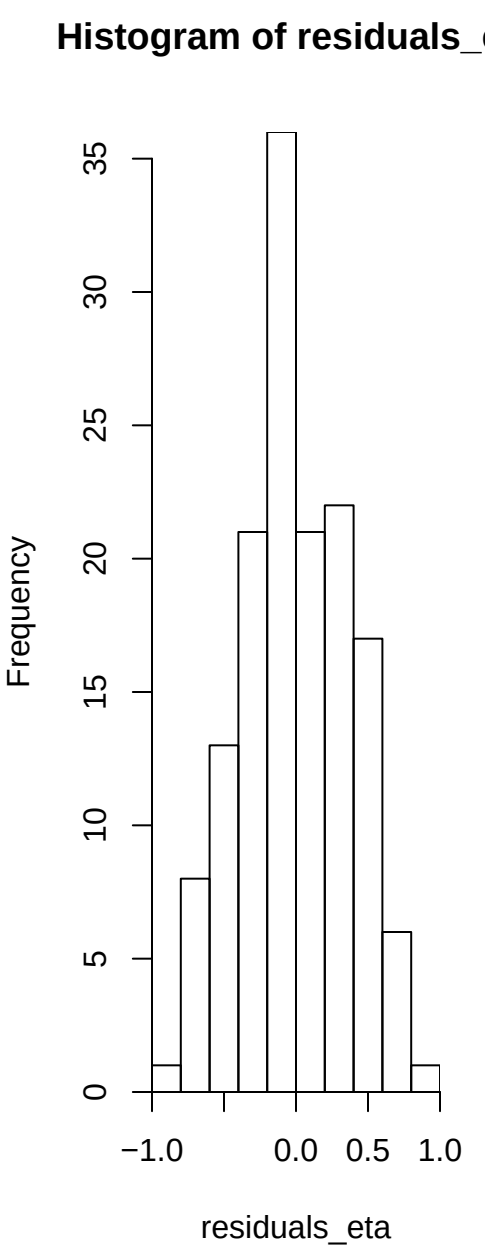
riginal data #

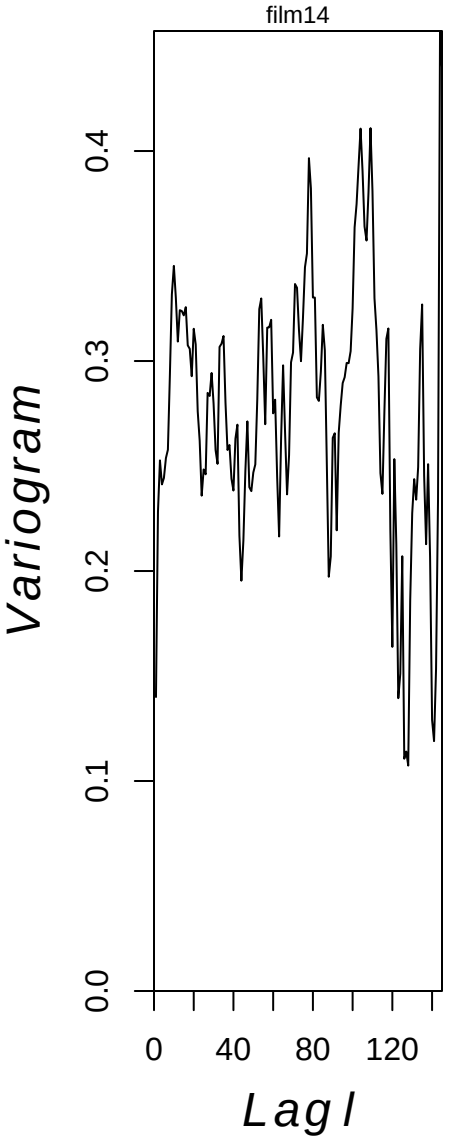

Series log_aeta
Partial ACF
0.4
0.3
0.2
0.1
0.0
−0.1
10
30
50
70
Lag

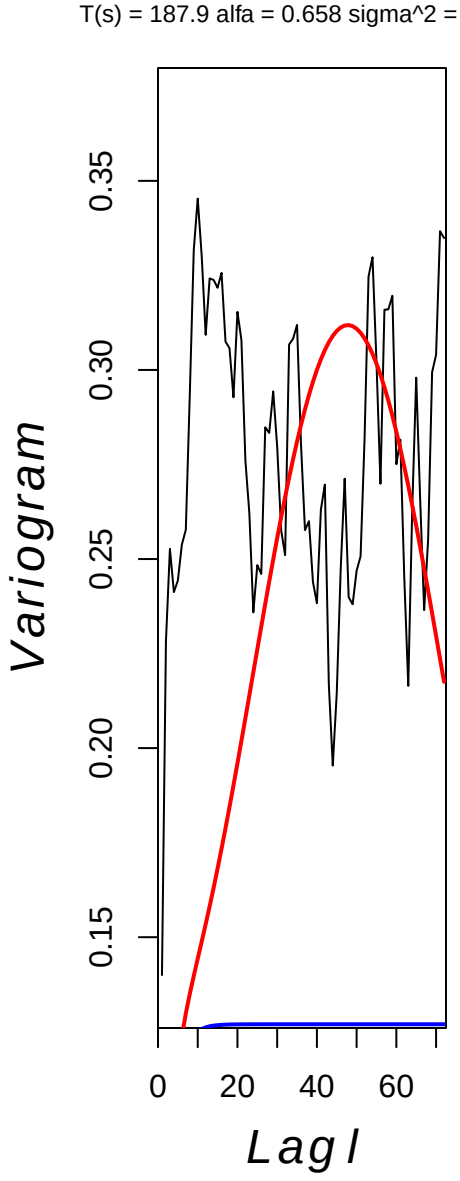

Series log_aeta
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
20
40
60
Lag

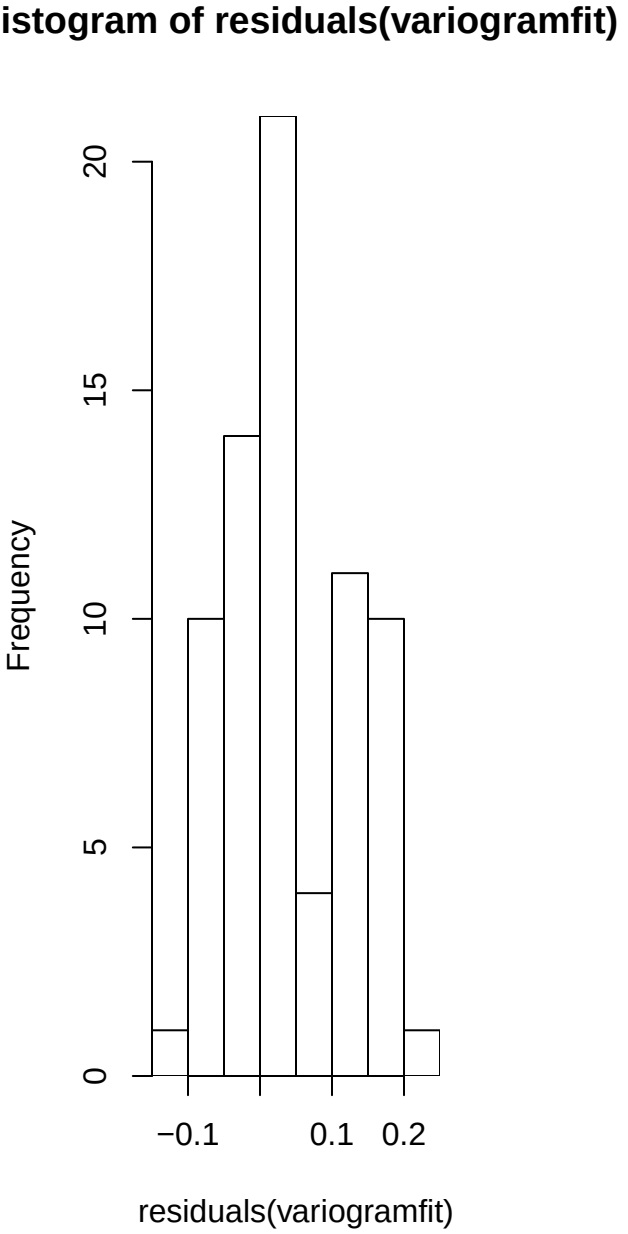

tau = 2.77 T = 39.3
acf_value
1.0
0.5
0.0
0
20
40
lag_acf

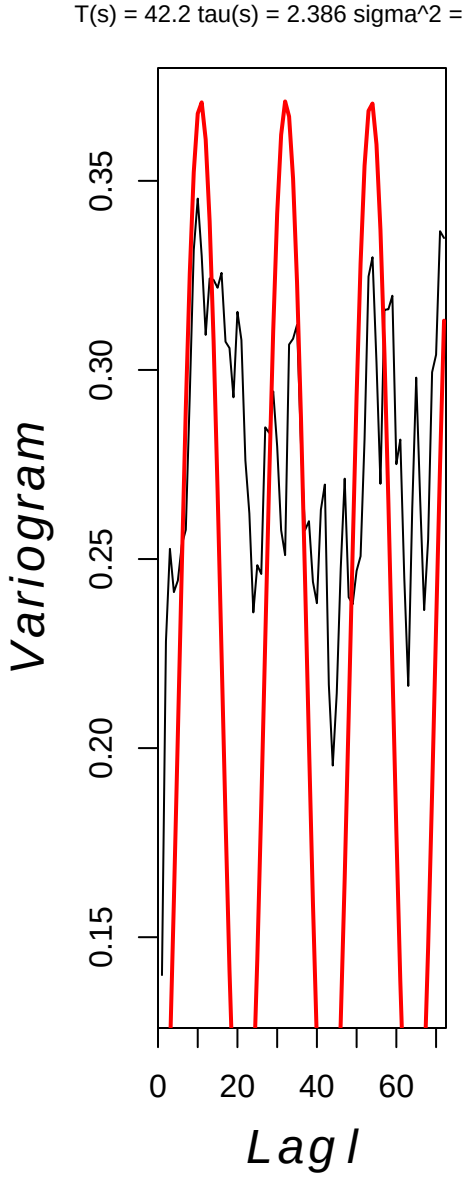

eta> 13.74 st dev+6.26 st dev−4.330
η(t)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0
100
200
t(s)

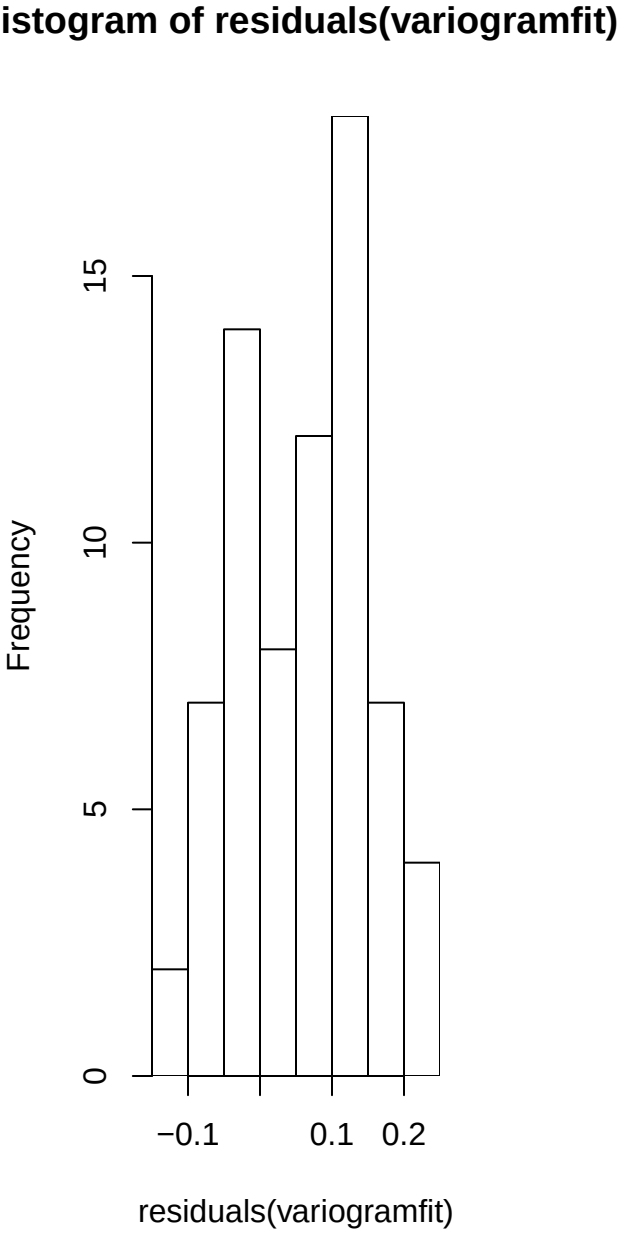

Histogram of residuals_eta
Frequency
0
5
10
15
20
25
30
35
−1.0
0.0
0.5
1.0
residuals_eta

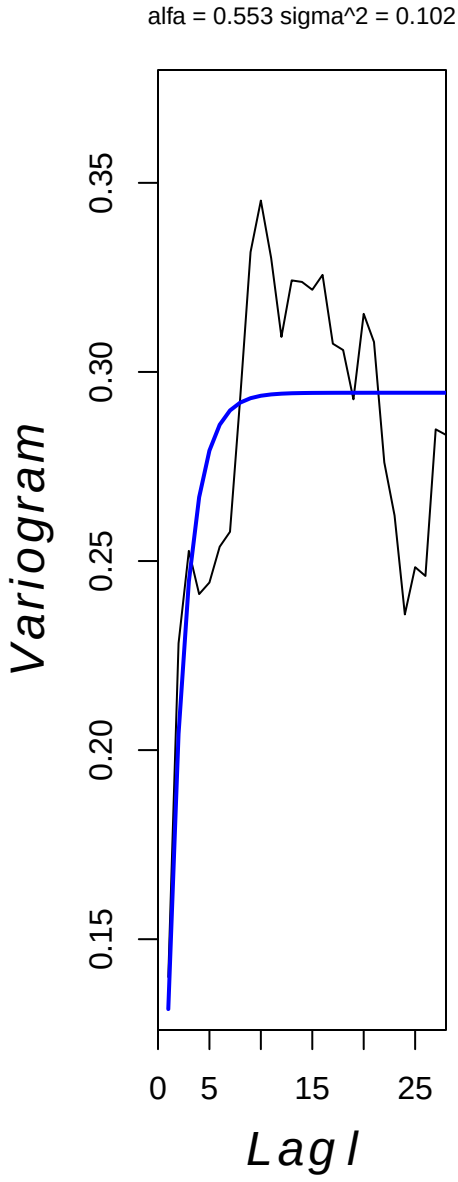

film14
Variogram
0.0
0.1
0.2
0.3
0.4
0
40
80
120
Lag l

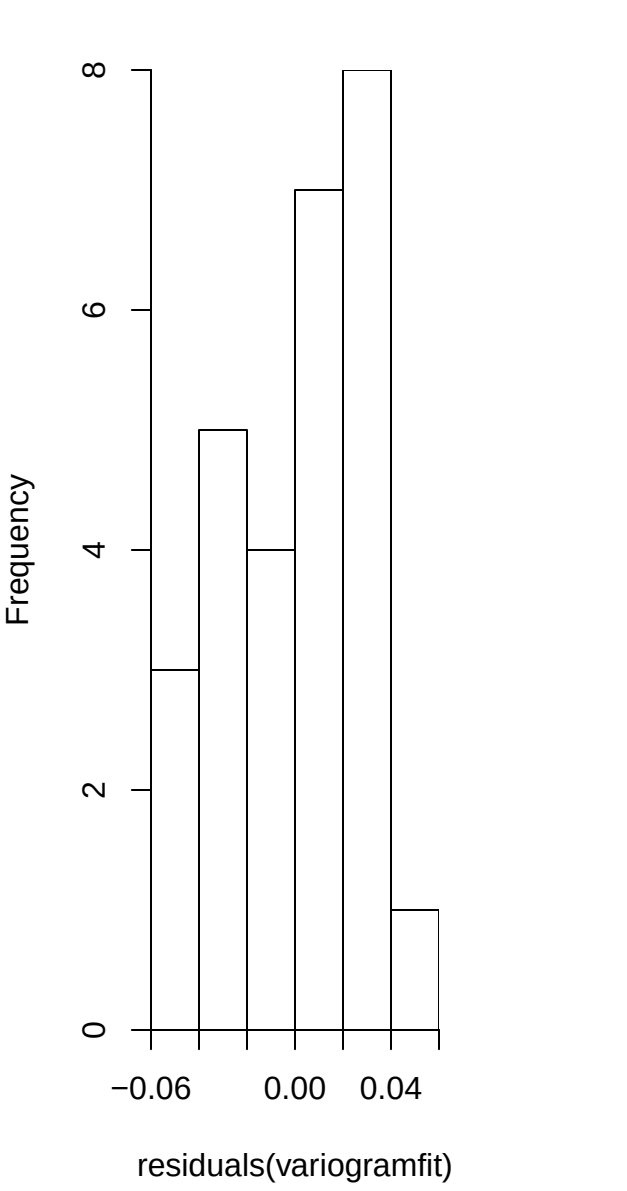

T(s) = 187.9 alfa = 0.658 sigma^2 = 0.036
Variogram
0.15
0.20
0.25
0.30
0.35
0
20
40
60
Lag l

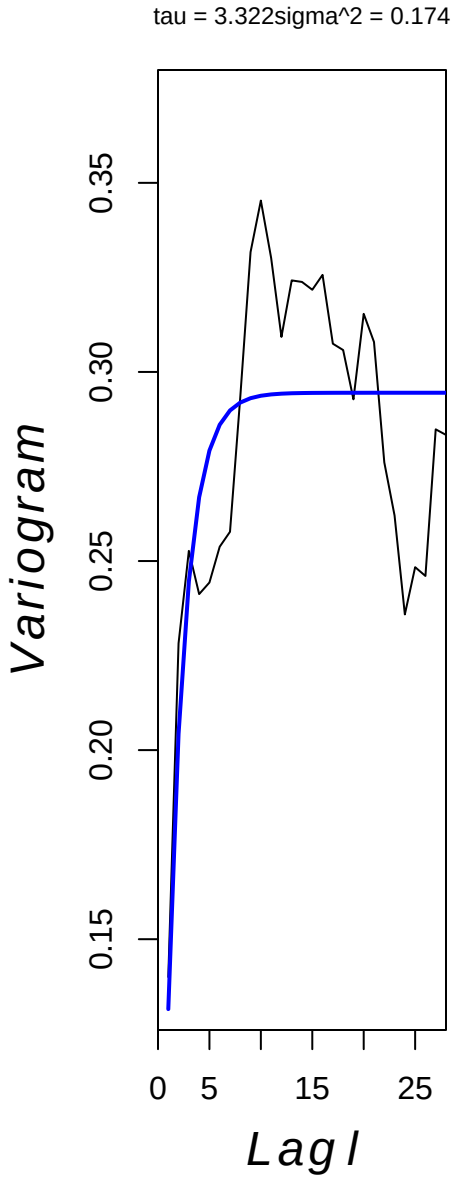

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
20
−0.1
0.1
0.2
residuals(variogramfit)

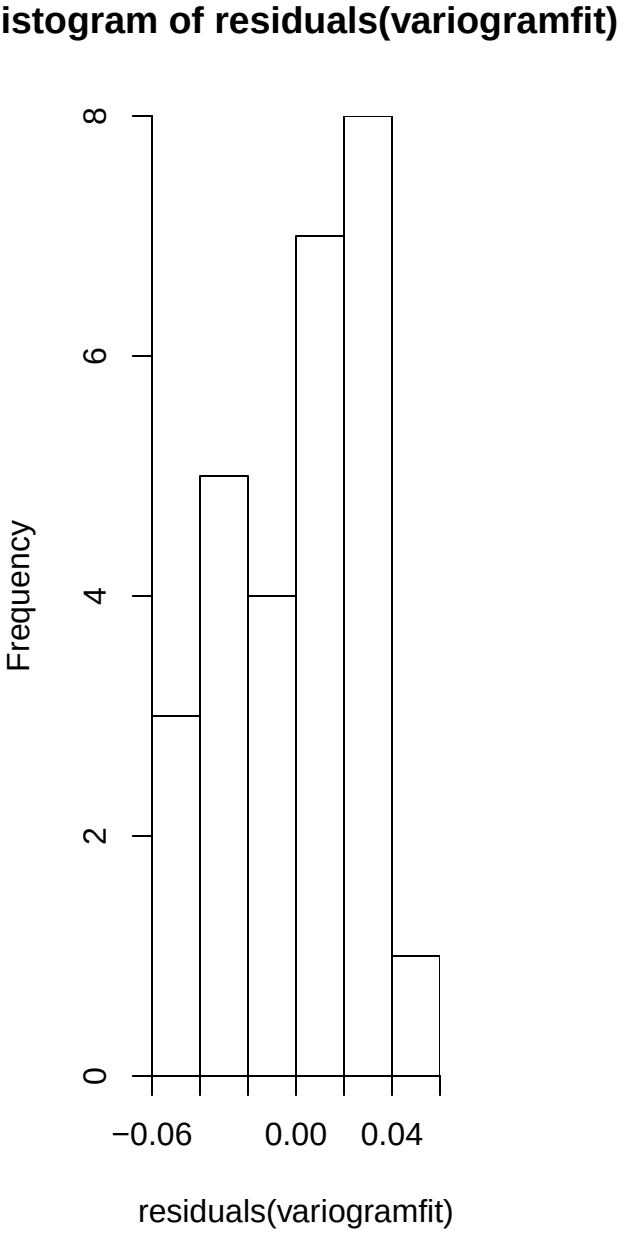

T(s) = 42.2 tau(s) = 2.386 sigma^2 = 0.058
Variogram
Lag l
0.15
0.20
0.25
0.30
0.35
0
20
40
60

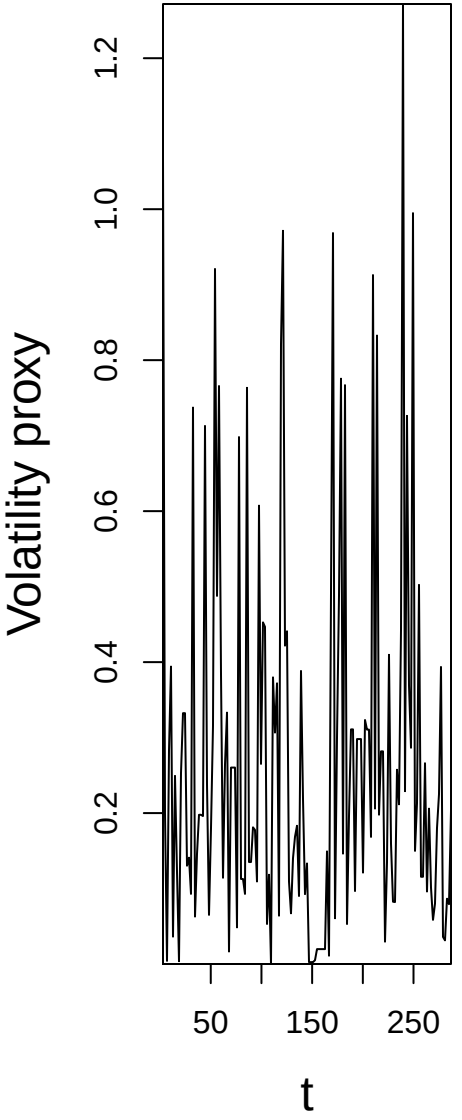

Histogram of residuals(variogramfit)
Frequency
residuals(variogramfit)
0
5
10
15
−0.1
0.1
0.2

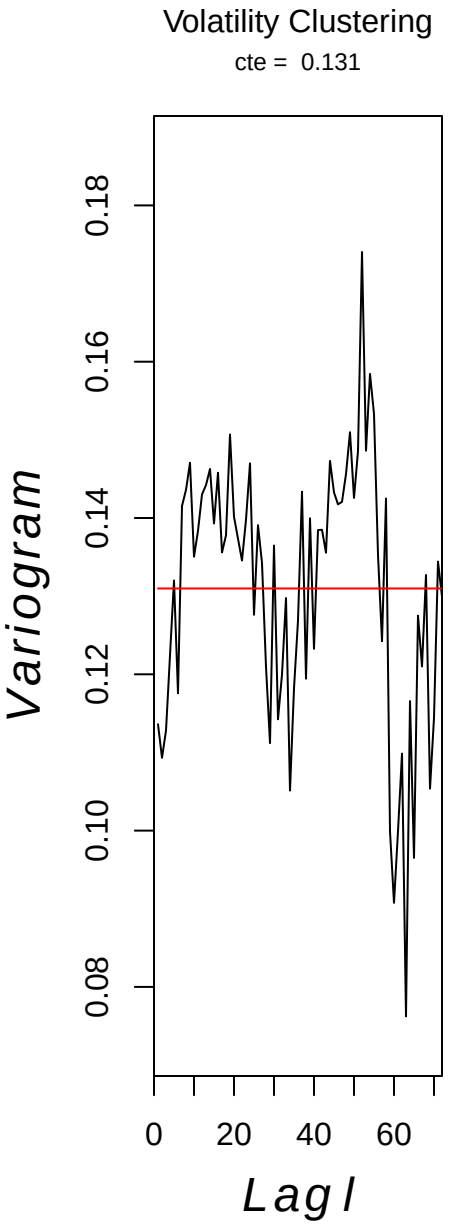

alfa = 0.553 sigma^2 = 0.102
Variogram
0.15
0.20
0.25
0.30
0.35
0
5
15
25
Lag l

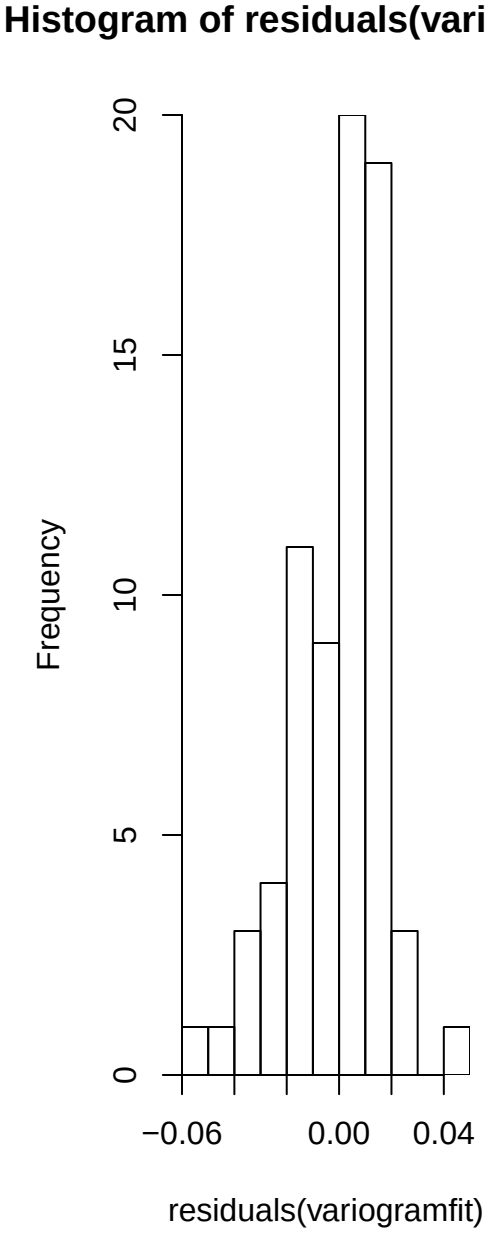

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
−0.06
0.00
0.04
residuals(variogramfit)

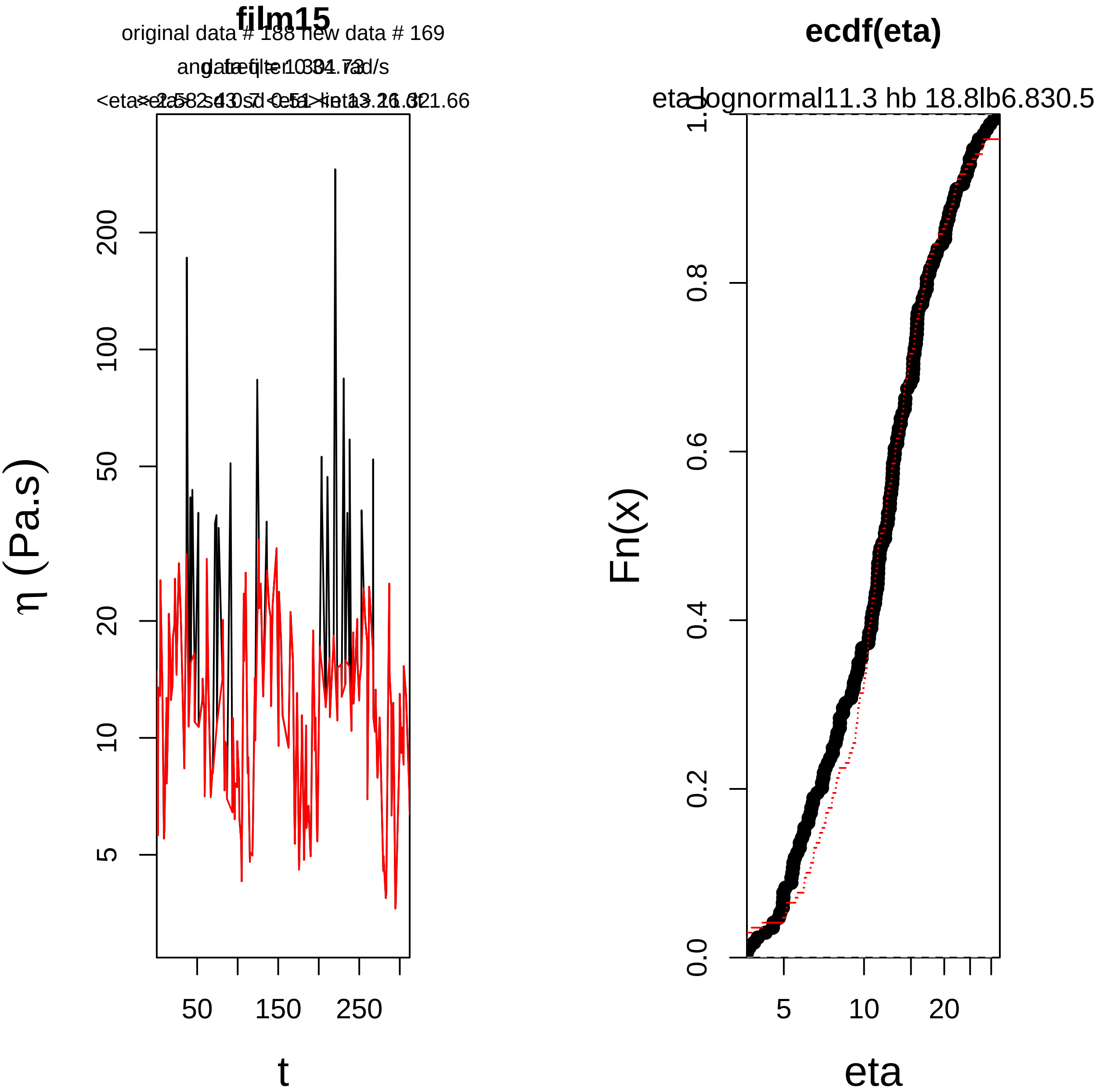

tau = 3.322sigma^2 = 0.174
Variogram
Lag l
0.15
0.20
0.25
0.30
0.35
0
5
15
25

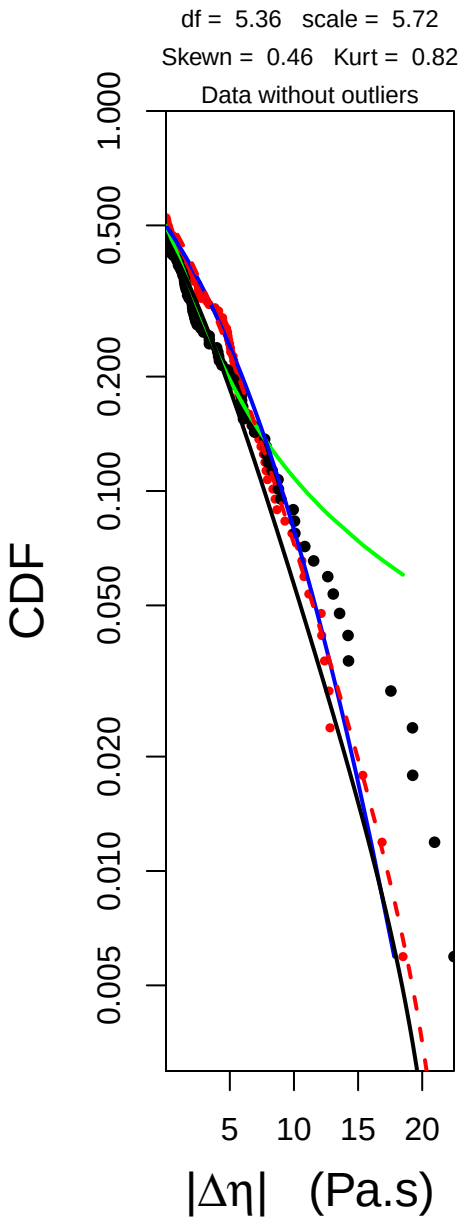

Histogram of residuals(variogramfit)
Frequency
residuals(variogramfit)
0
2
4
6
8
−0.06
0.00
0.04

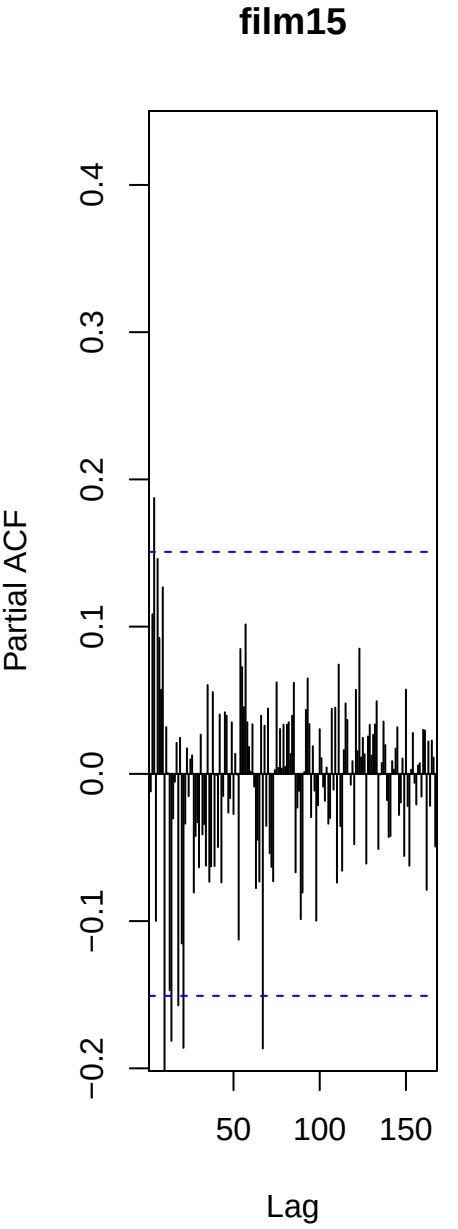

Volatility proxy
0.2
0.4
0.6
0.8
1.0
1.2
50
150
250
t

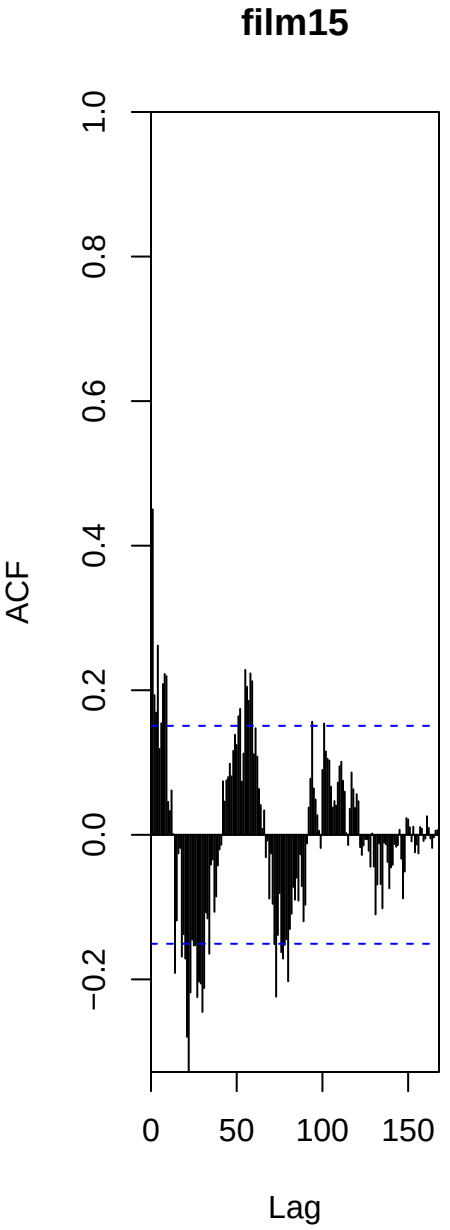

Volatility Clustering
cte = 0.131
Variogram
0.08
0.10
0.12
0.14
0.16
0.18
0
20
40
60
Lag l

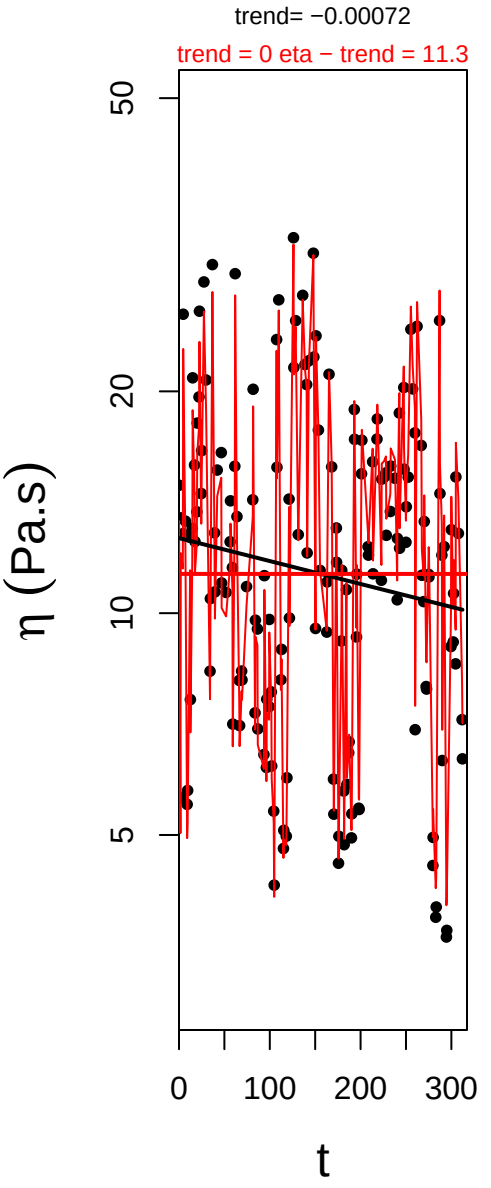

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
20
−0.06
0.00
0.04
residuals(variogramfit)

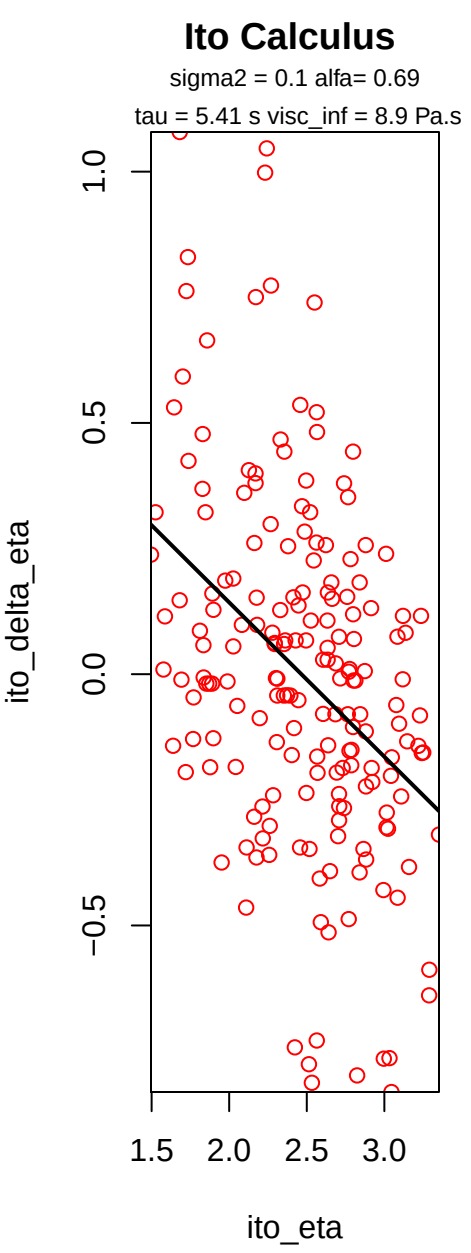

film15
original data # 188 new data # 169
η (Pa.s)
t
ecdf(eta)
Fn(x)
eta

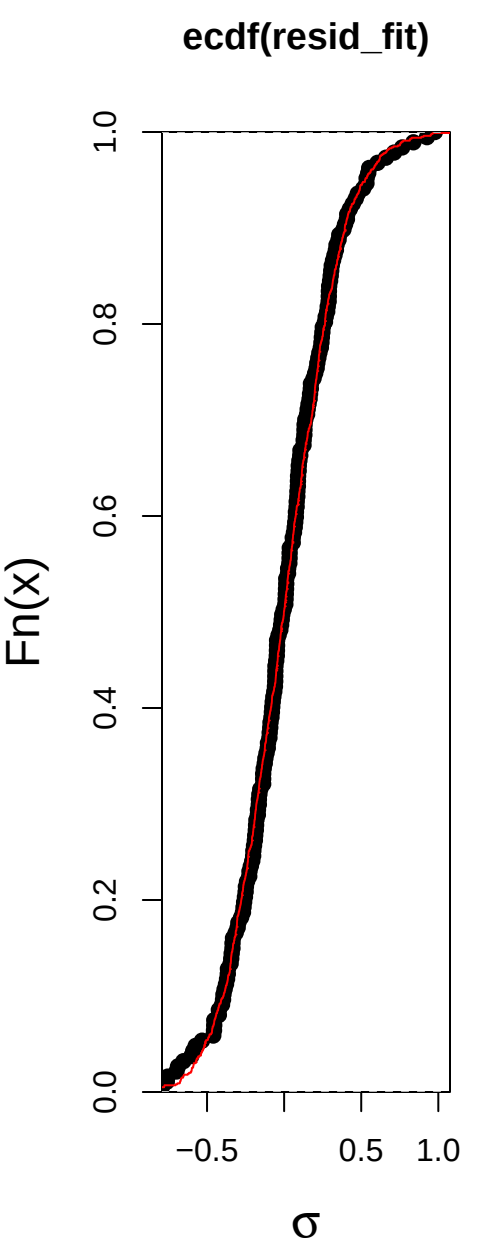

df = 5.36 scale = 5.72
Skewn = 0.46 Kurt = 0.82
Data without outliers
CDF
1.000
0.500
0.200
0.100
0.050
0.020
0.010
0.005
5
10
15
20
|Δη| (Pa.s)

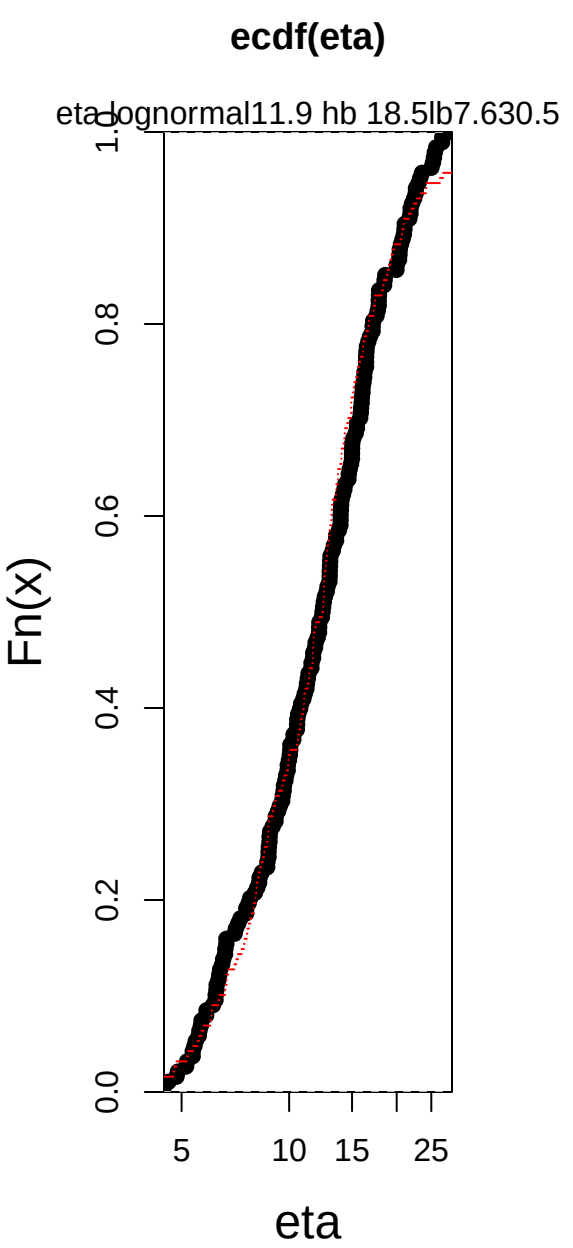

film15
Partial ACF
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
50
100
150
Lag

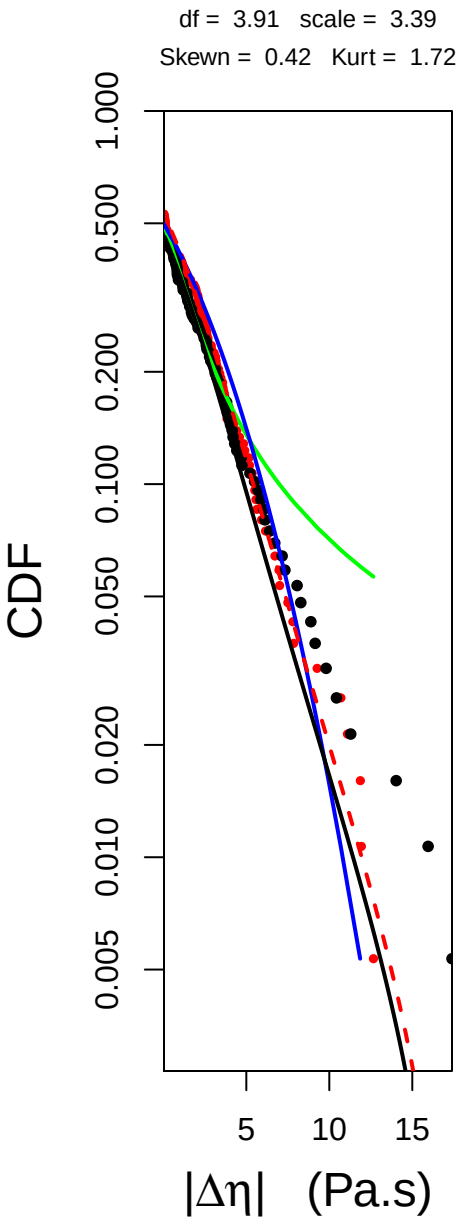

film15
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
50
100
150
Lag


trend= −0.00072
trend = 0 eta − trend = 11.3
η (Pa.s)
50
20
10
5
0
100
200
300
t

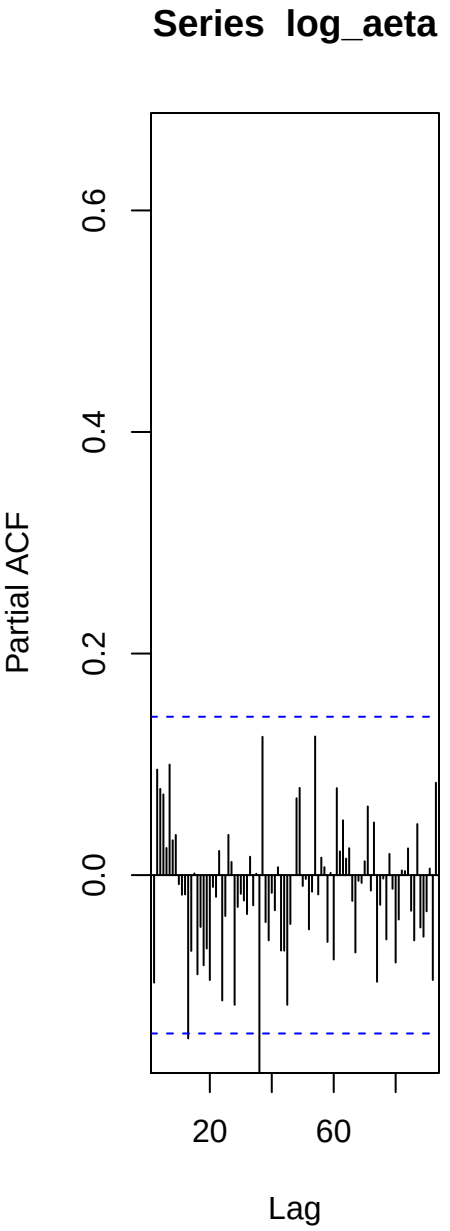

Ito Calculus
sigma2 = 0.1 alfa= 0.69
tau = 5.41 s visc_inf = 8.9 Pa.s
ito_delta_eta
1.0
0.5
0.0
−0.5
1.5
2.0
2.5
3.0
ito_eta

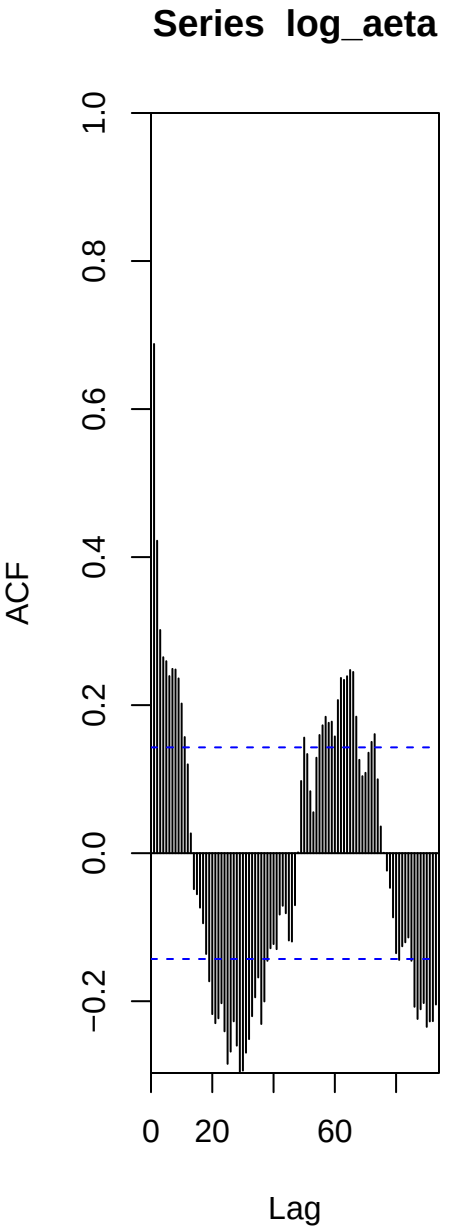

ecdf(resid_fit)
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
−0.5
0.5
1.0
σ

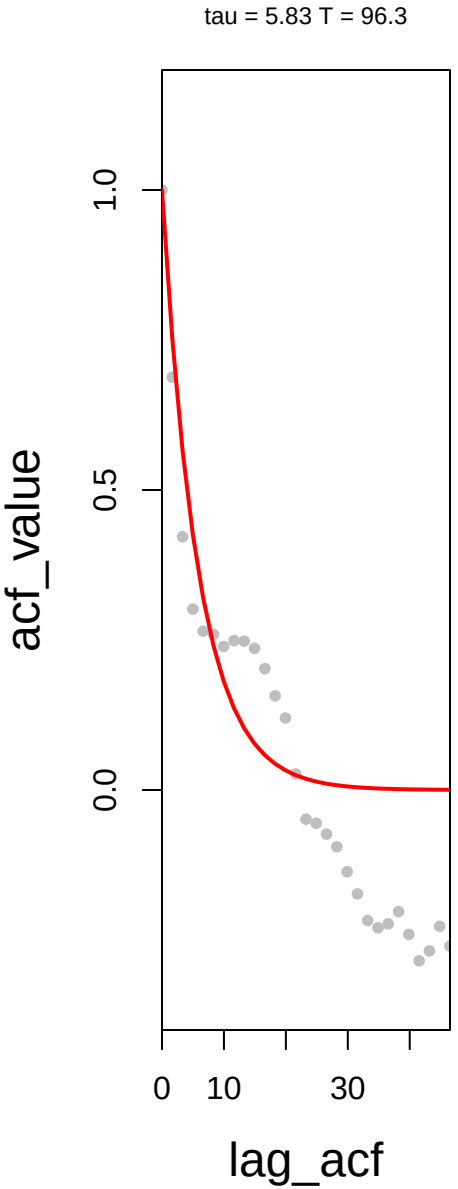


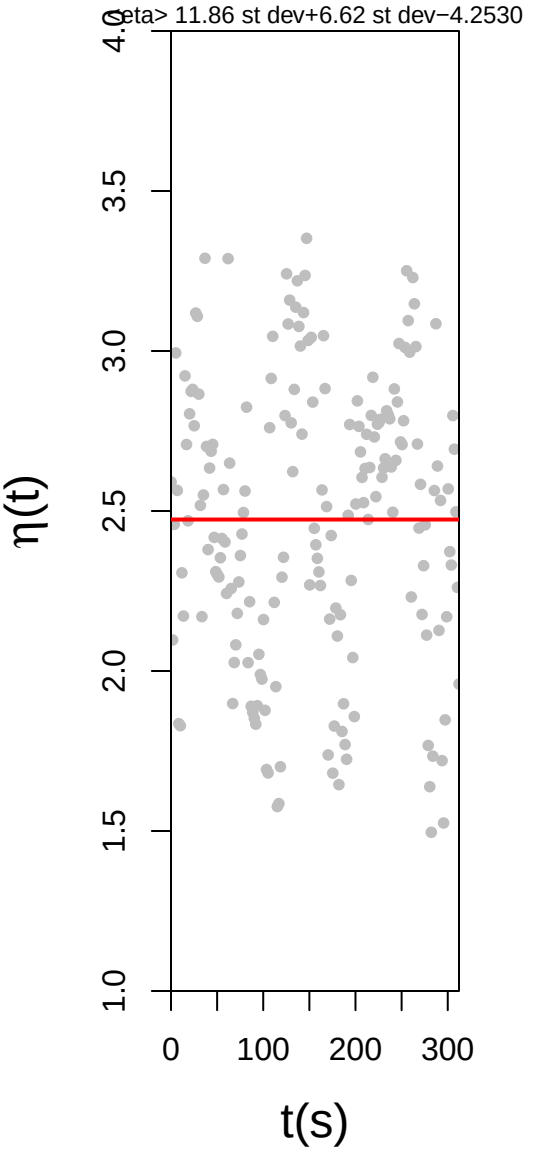


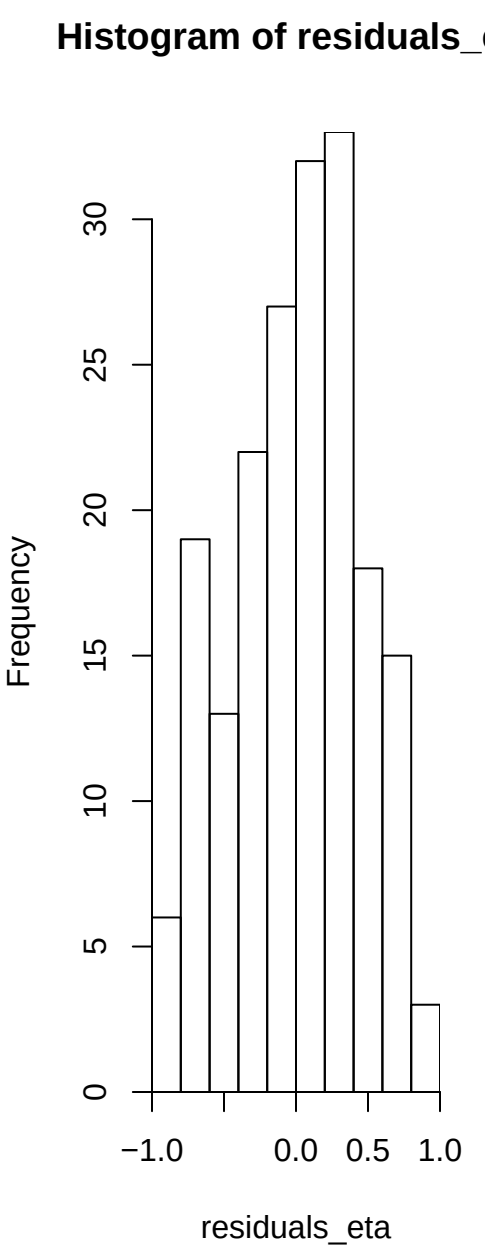
original data #

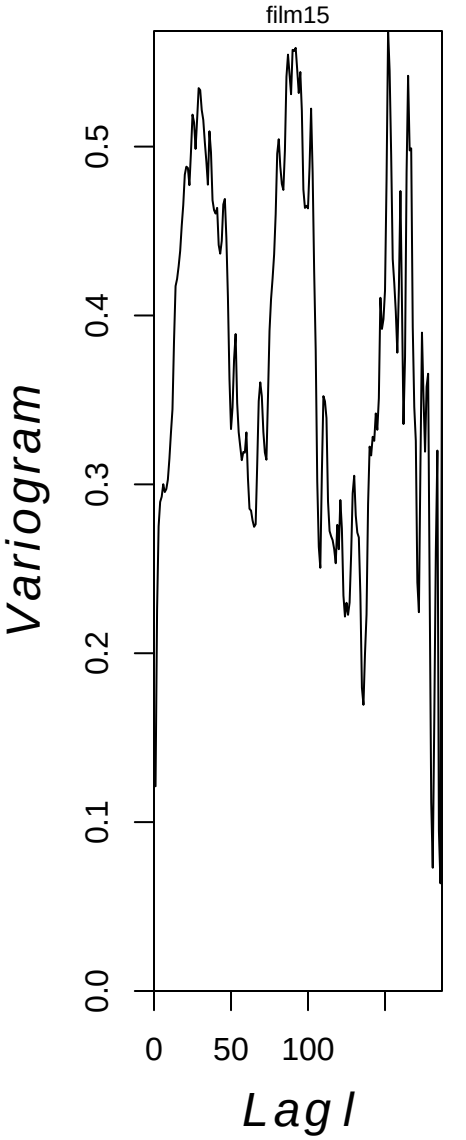

Series log_aeta
Partial ACF
0.0
0.2
0.4
0.6
20
60
Lag

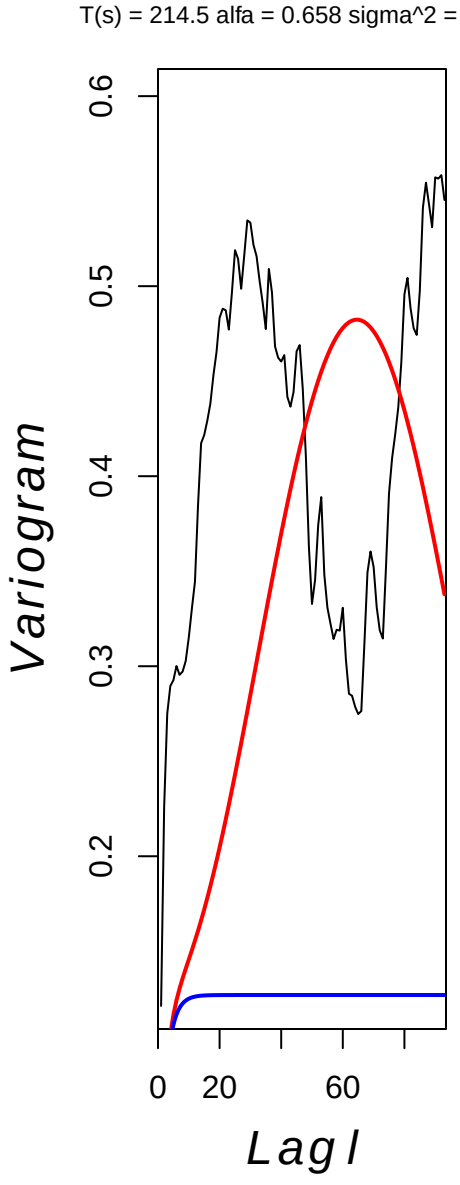

Series log_aeta
ACF
−0.2
0.0
0.2
0.4
0.6
0.8
1.0
0
20
60
Lag

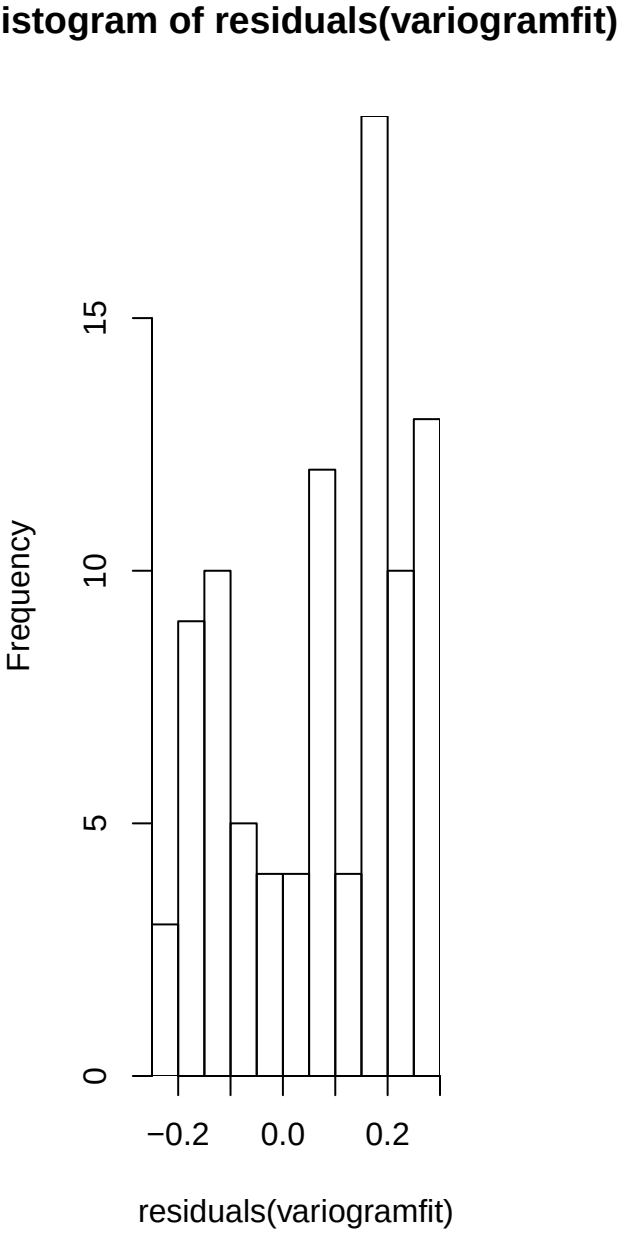

tau = 5.83 T = 96.3
acf_value
1.0
0.5
0.0
0
10
30
lag_acf

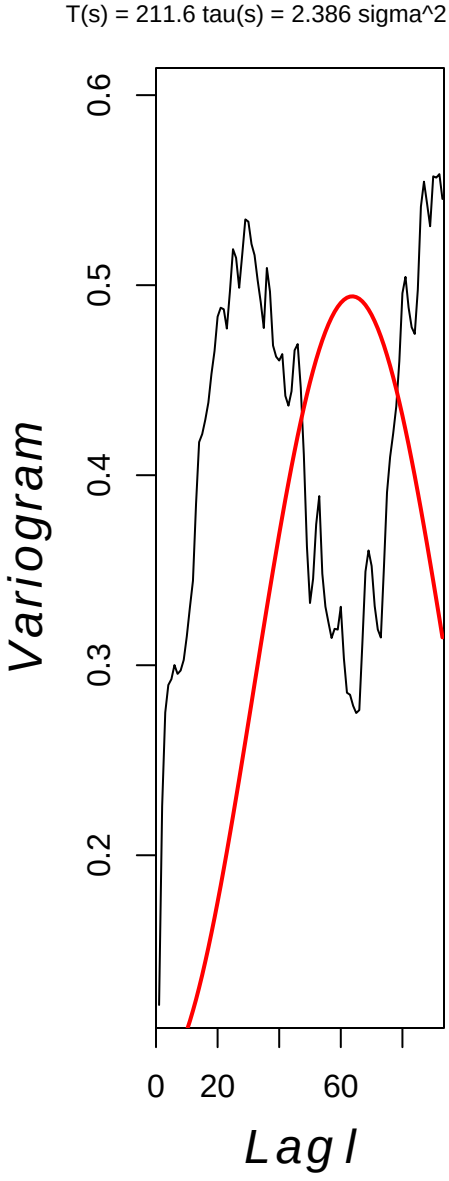

eta> 11.86 st dev+6.62 st dev−4.2530
η(t)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0
100
200
300
t(s)

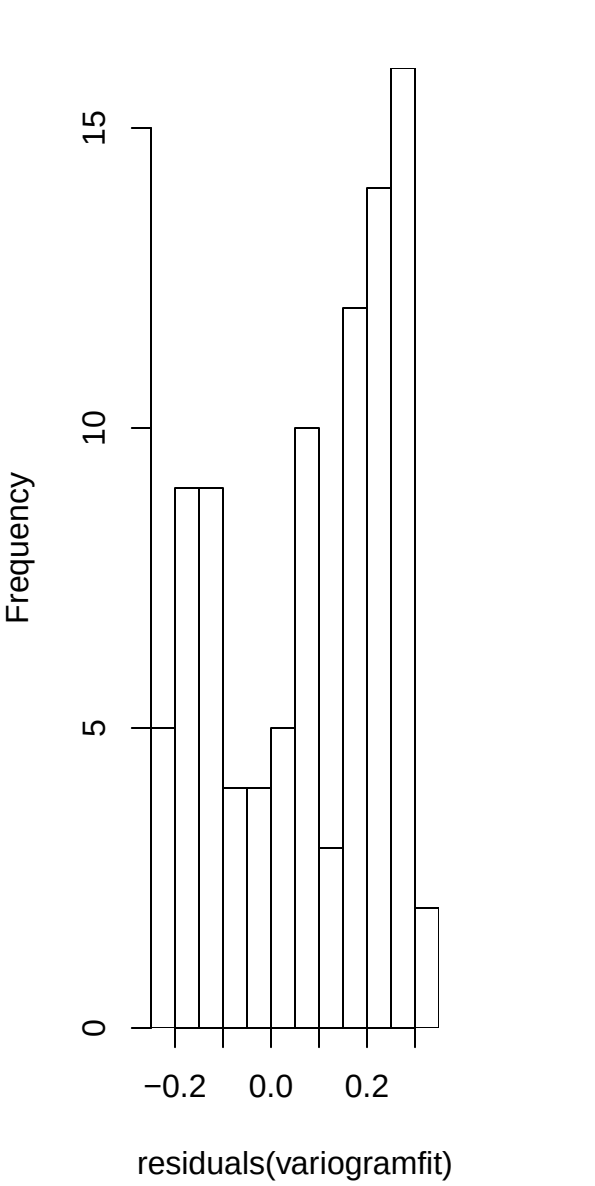

Histogram of residuals_eta
Frequency
0
5
10
15
20
25
30
−1.0
0.0
0.5
1.0
residuals_eta

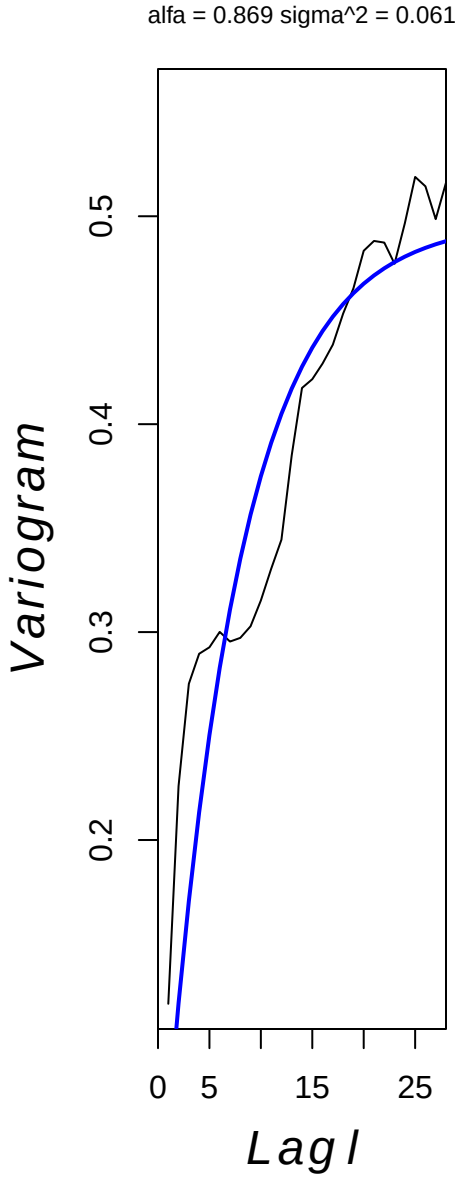

film15
Variogram
0.0
0.1
0.2
0.3
0.4
0.5
0
50
100
Lag l

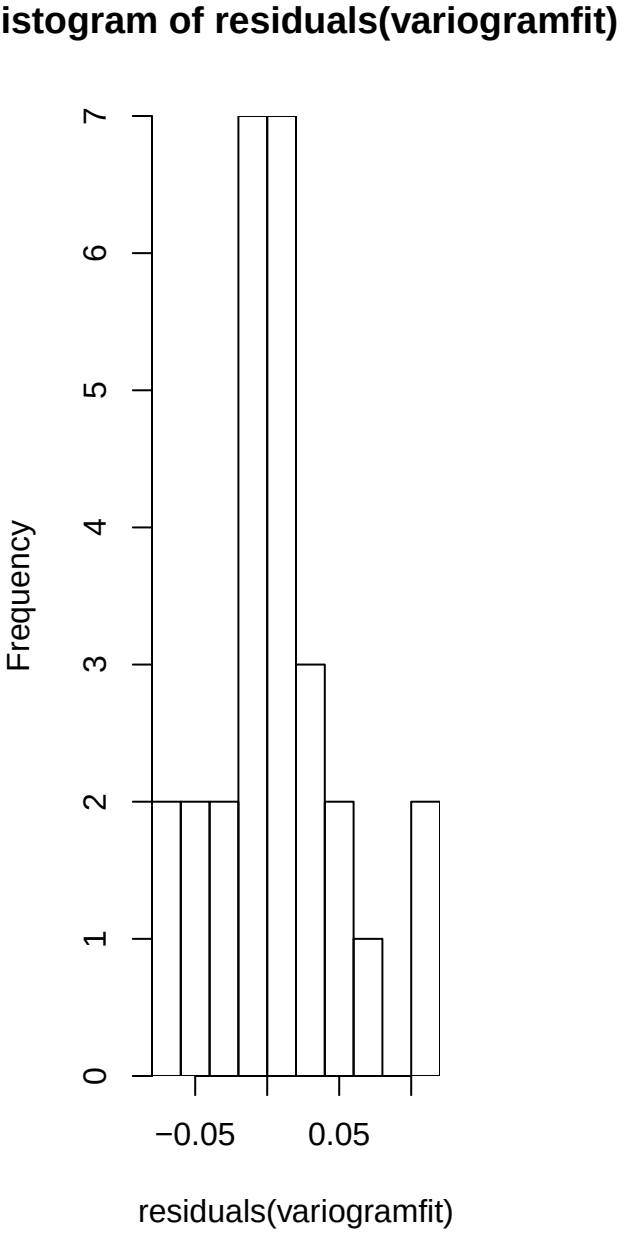

T(s) = 214.5 alfa = 0.658 sigma^2 = 0.036
Variogram
0.2
0.3
0.4
0.5
0.6
0
20
60
Lag l

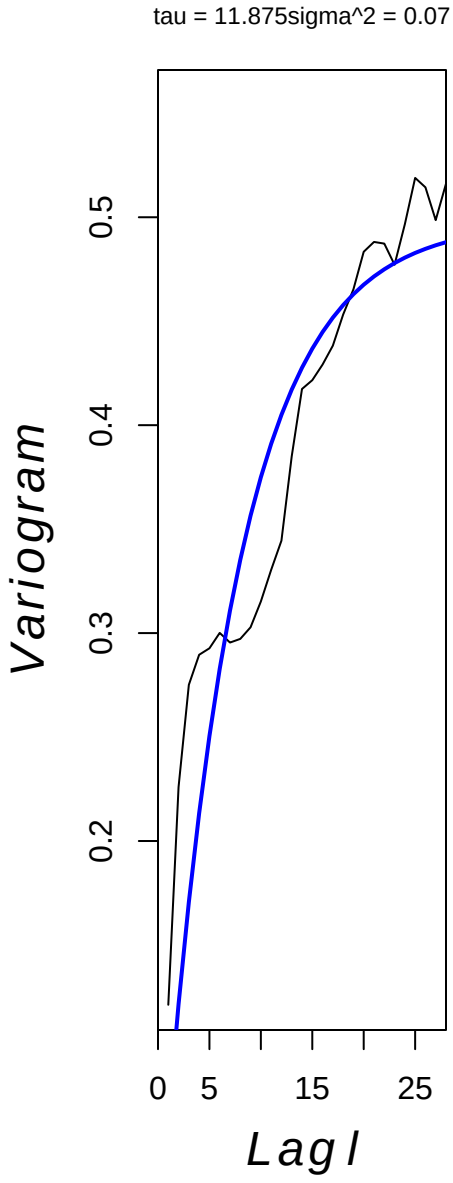

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
−0.2
0.0
0.2
residuals(variogramfit)

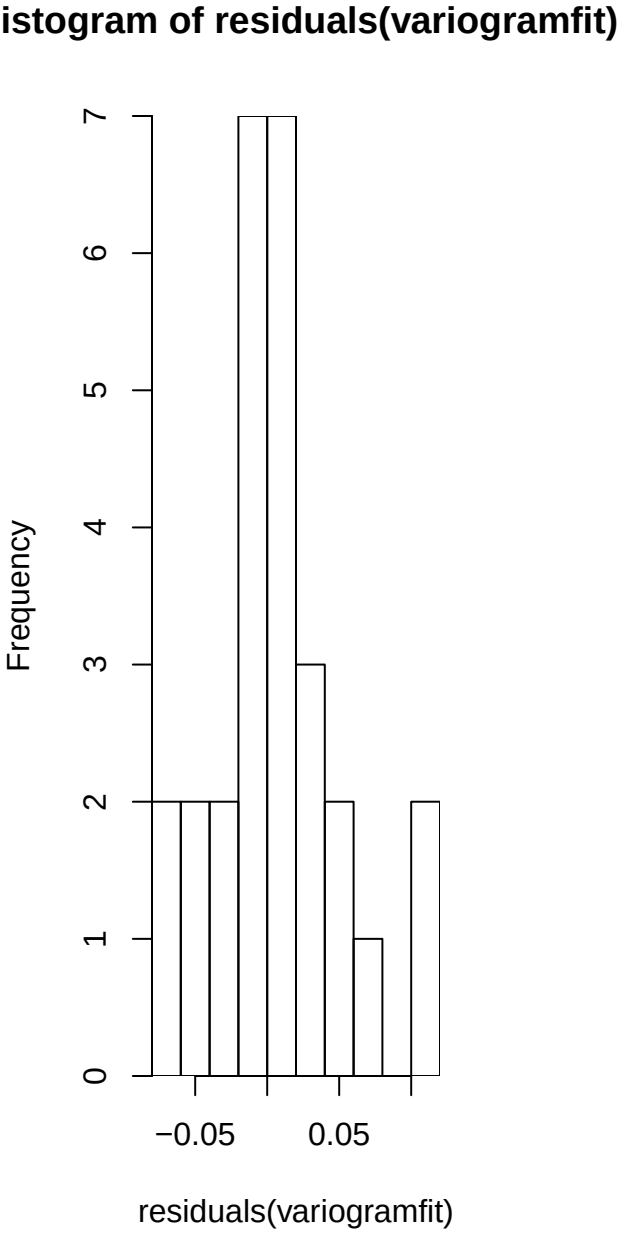

T(s) = 211.6 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.2
0.3
0.4
0.5
0.6
0
20
60
Lag l

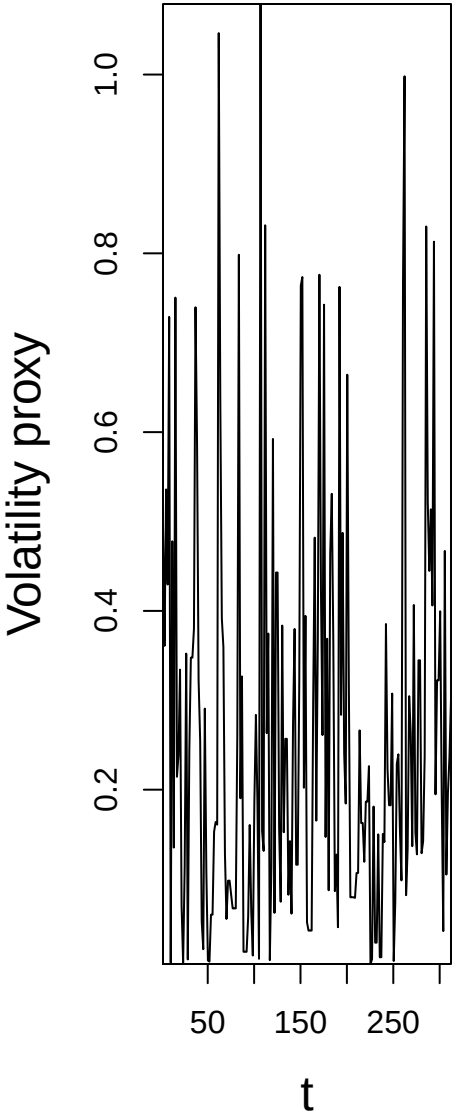

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
−0.2
0.0
0.2
residuals(variogramfit)

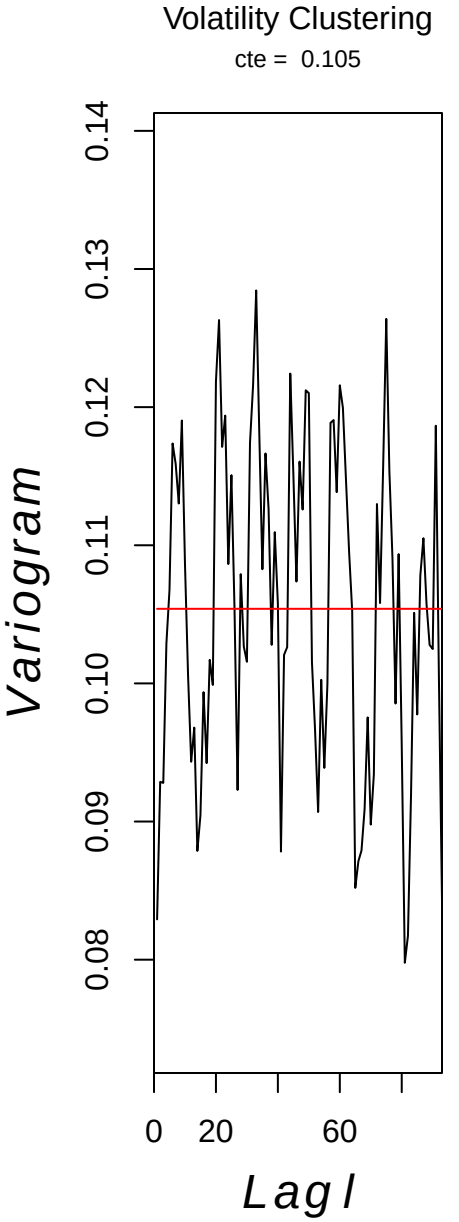

alfa = 0.869 sigma^2 = 0.061
Variogram
0.2
0.3
0.4
0.5
0
5
15
25
Lag l

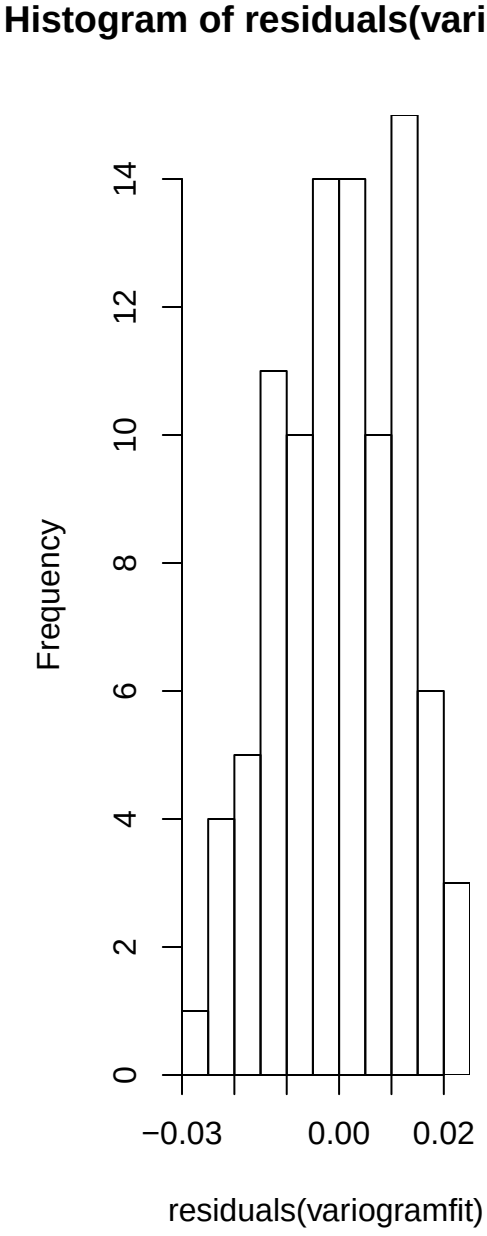

Histogram of residuals(variogramfit)
Frequency
0
1
2
3
4
5
6
7
−0.05
0.05
residuals(variogramfit)

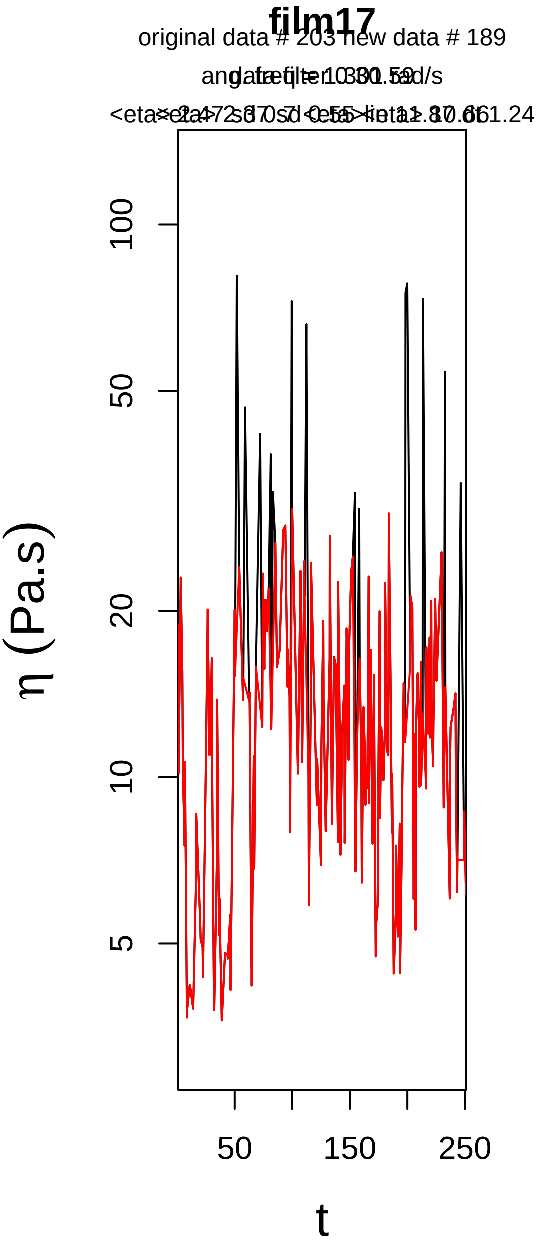

tau = 11.875sigma^2 = 0.07
Variogram
0.2
0.3
0.4
0.5
0
5
15
25
Lag l

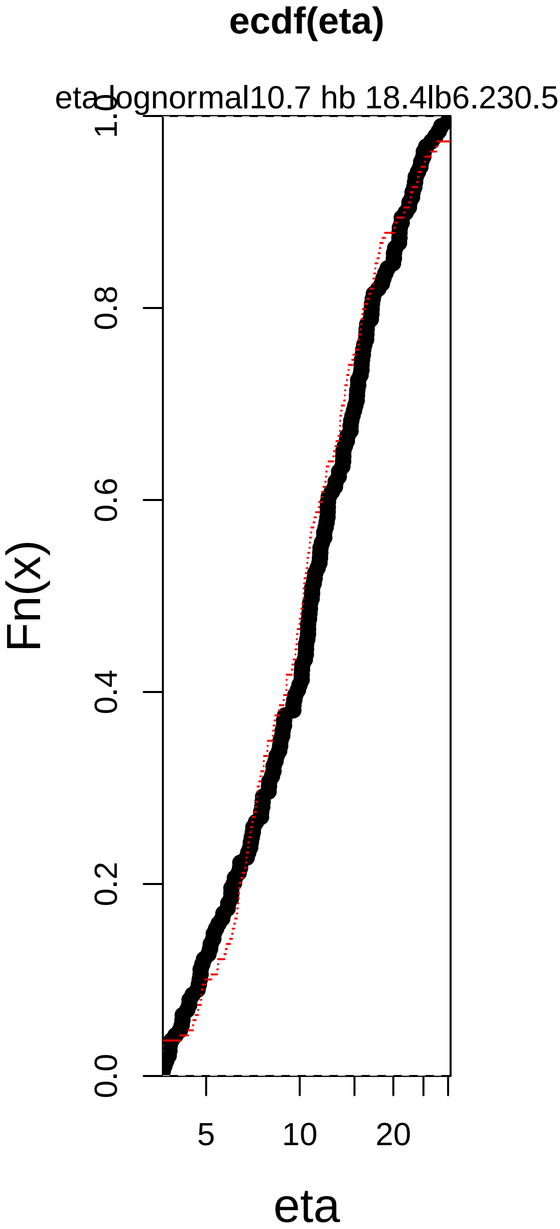

Histogram of residuals(variogramfit)
Frequency
0
1
2
3
4
5
6
7
−0.05
0.05
residuals(variogramfit)

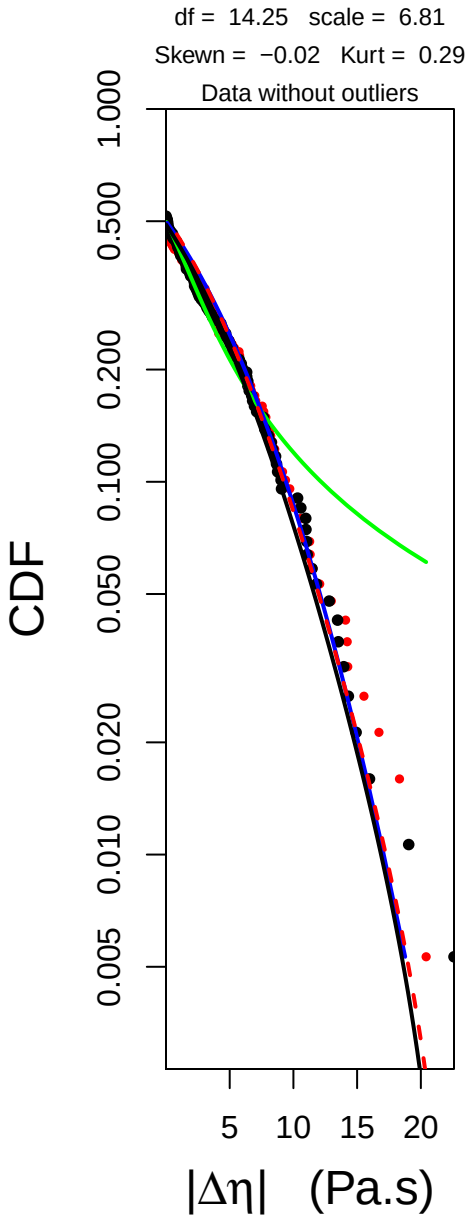

Volatility proxy
0.2
0.4
0.6
0.8
1.0
50
150
250
t

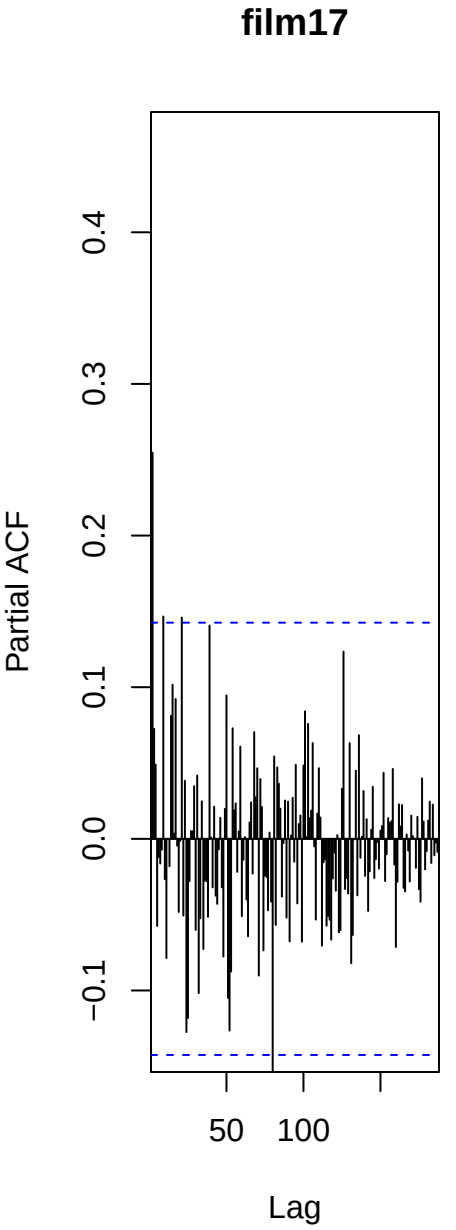

Volatility Clustering
cte = 0.105
Variogram
0.08
0.09
0.10
0.11
0.12
0.13
0.14
0
20
60
Lag l

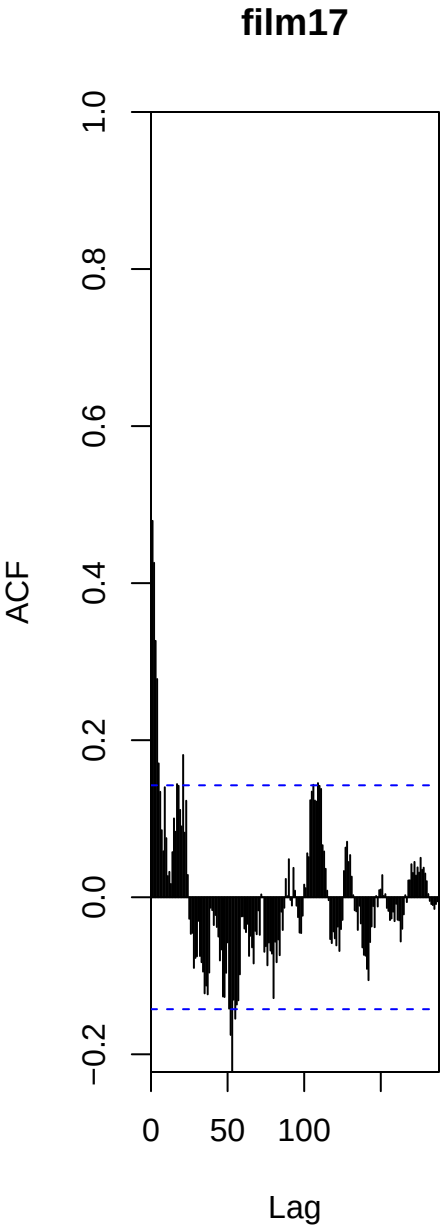

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
12
14
−0.03
0.00
0.02
residuals(variogramfit)

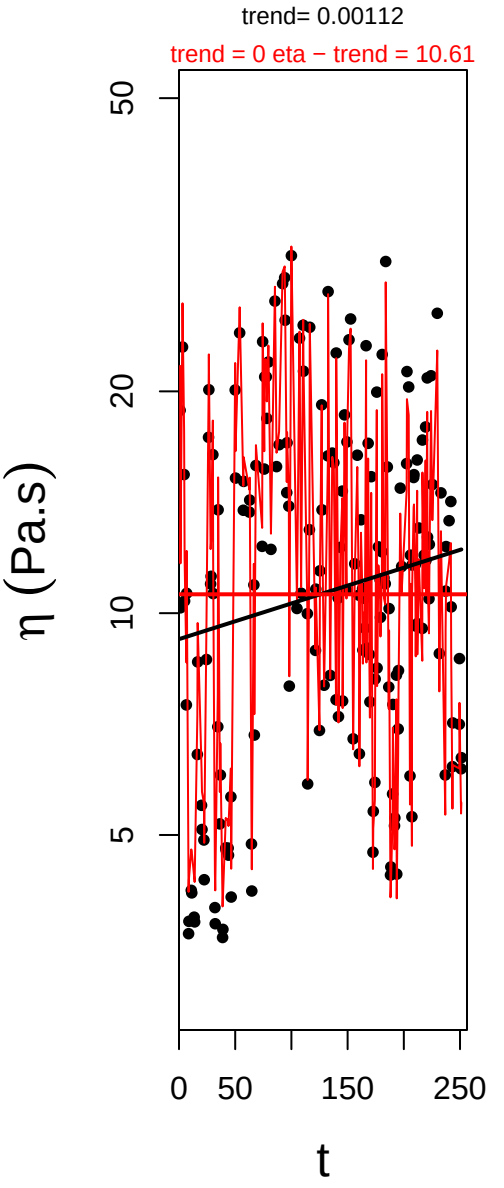

film17
original data # 203 new data # 189
t
η (Pa.s)
50
150
250
5
10
20
50
100

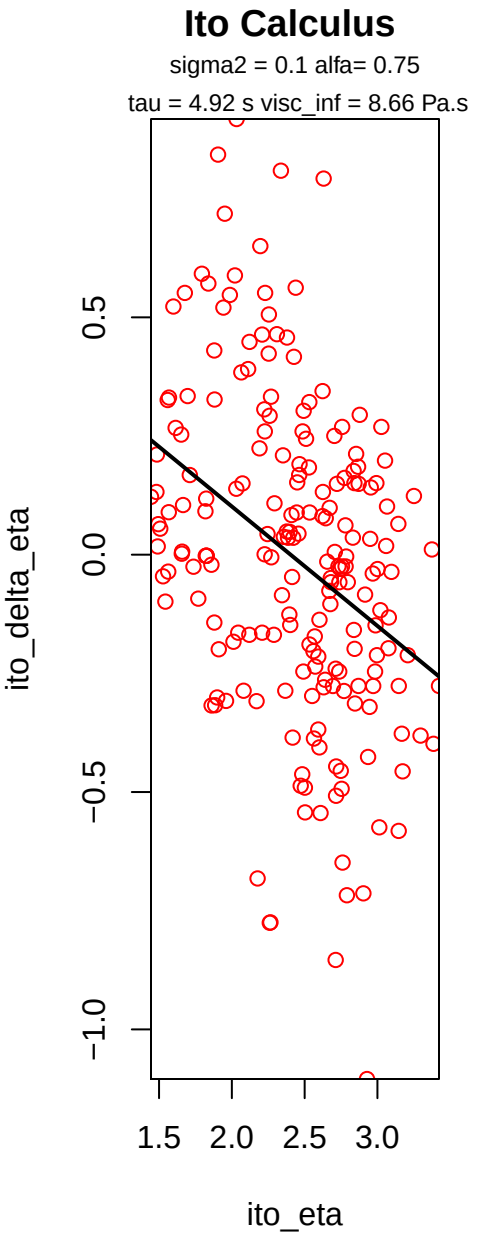

ecdf(eta)
eta lognormal10.7 hb 18.4lb6.230.5
Fn(x)
eta
0.0
0.2
0.4
0.6
0.8
1.0
5
10
20

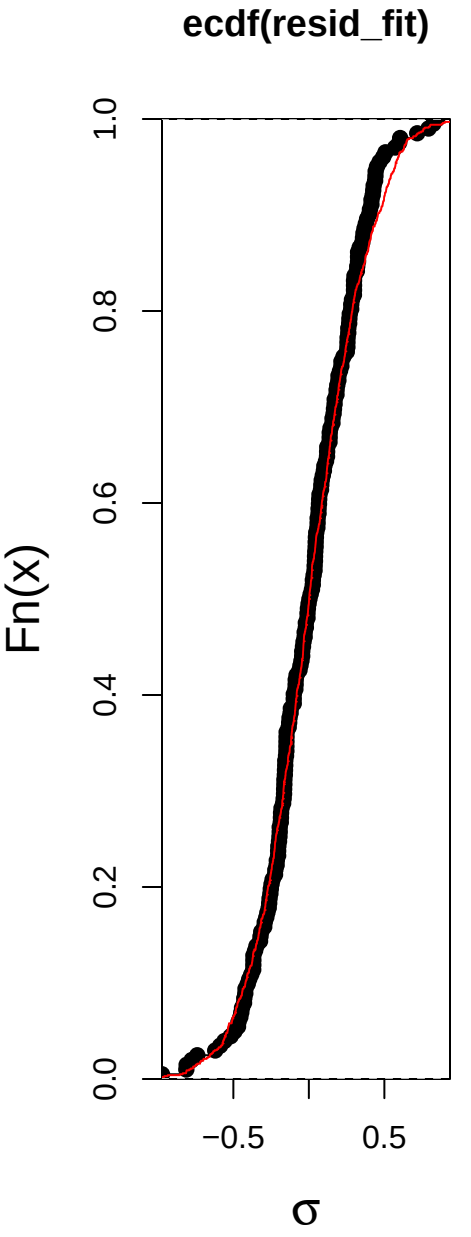

df = 14.25 scale = 6.81
Skewn = −0.02 Kurt = 0.29
Data without outliers
CDF
1.000
0.500
0.200
0.100
0.050
0.020
0.010
0.005
5
10
15
20
|Δη| (Pa.s)

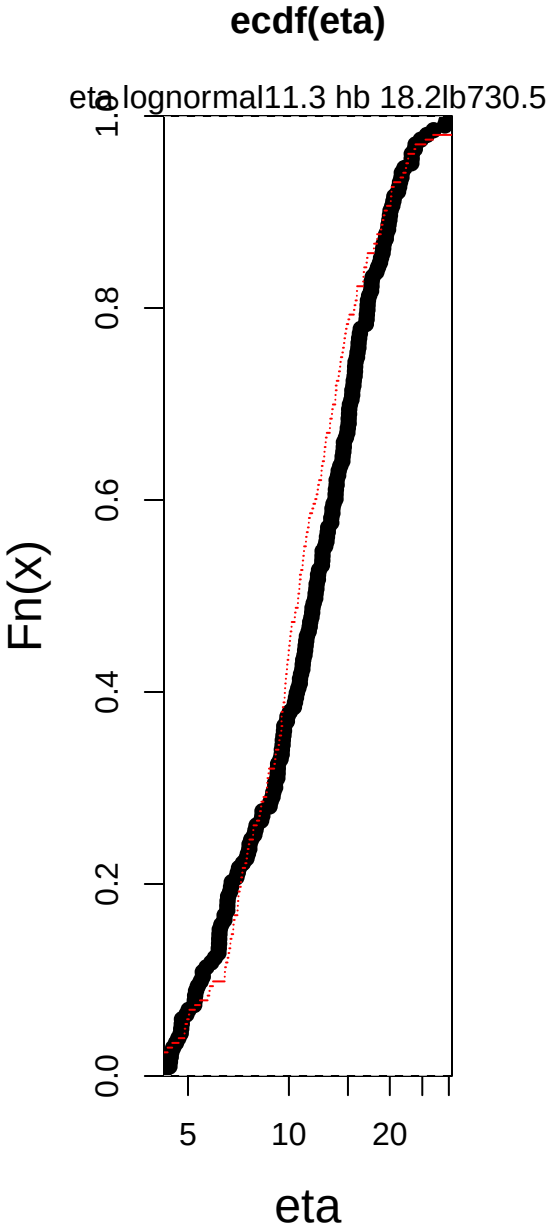

film17
Partial ACF
0.4
0.3
0.2
0.1
0.0
−0.1
50
100
Lag

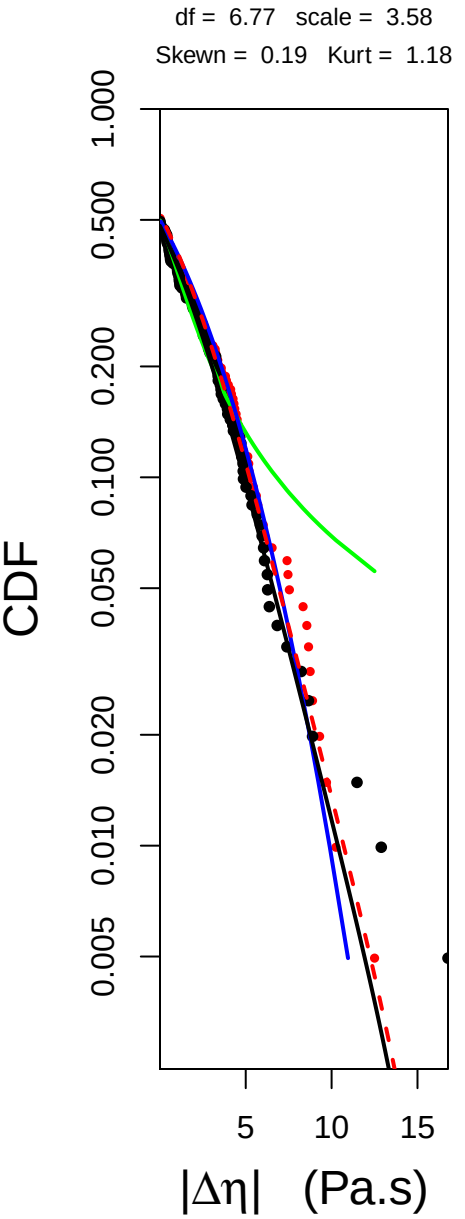

film17
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
50
100
Lag


trend= 0.00112
trend = 0 eta − trend = 10.61
η (Pa.s)
50
20
10
5
0
50
150
250
t

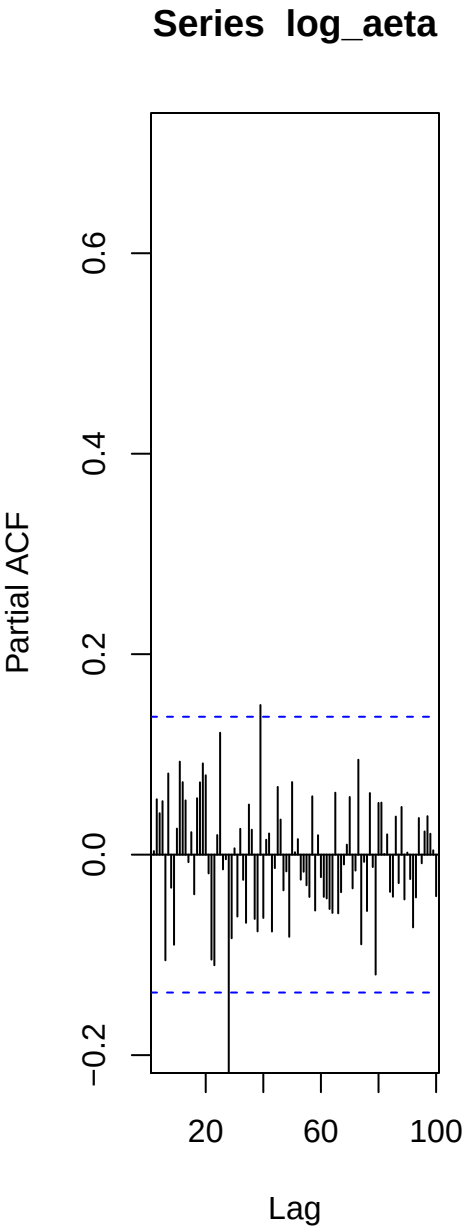

Ito Calculus
sigma2 = 0.1 alfa= 0.75
tau = 4.92 s visc_inf = 8.66 Pa.s
ito_delta_eta
0.5
0.0
−0.5
−1.0
1.5
2.0
2.5
3.0
ito_eta

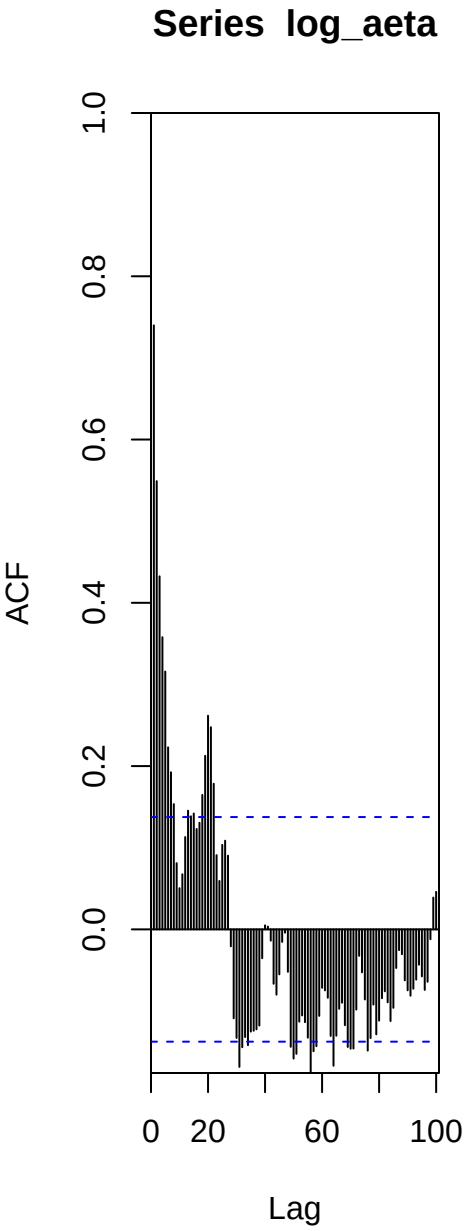

ecdf(resid_fit)
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
−0.5
0.5
σ

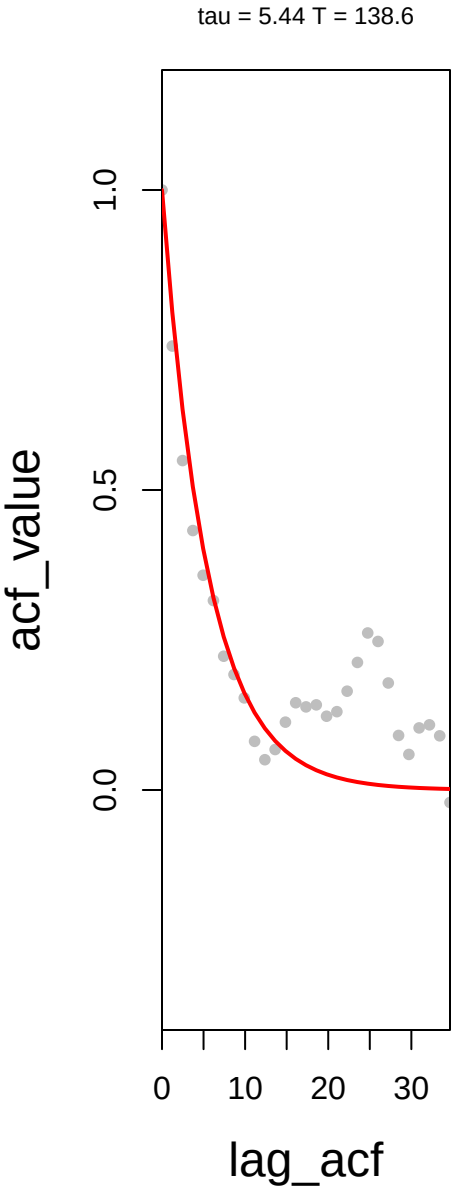


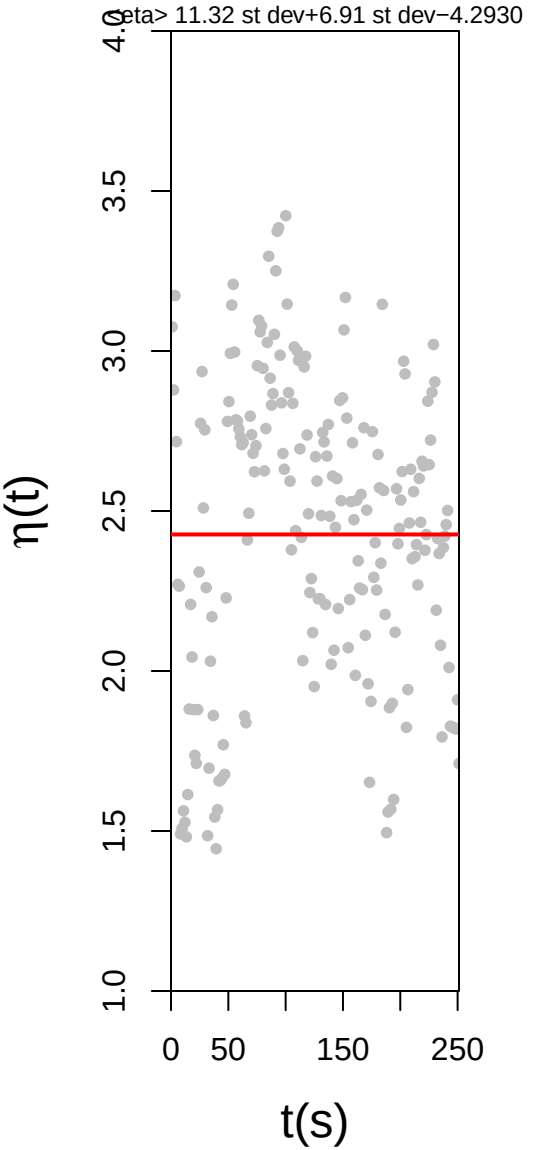


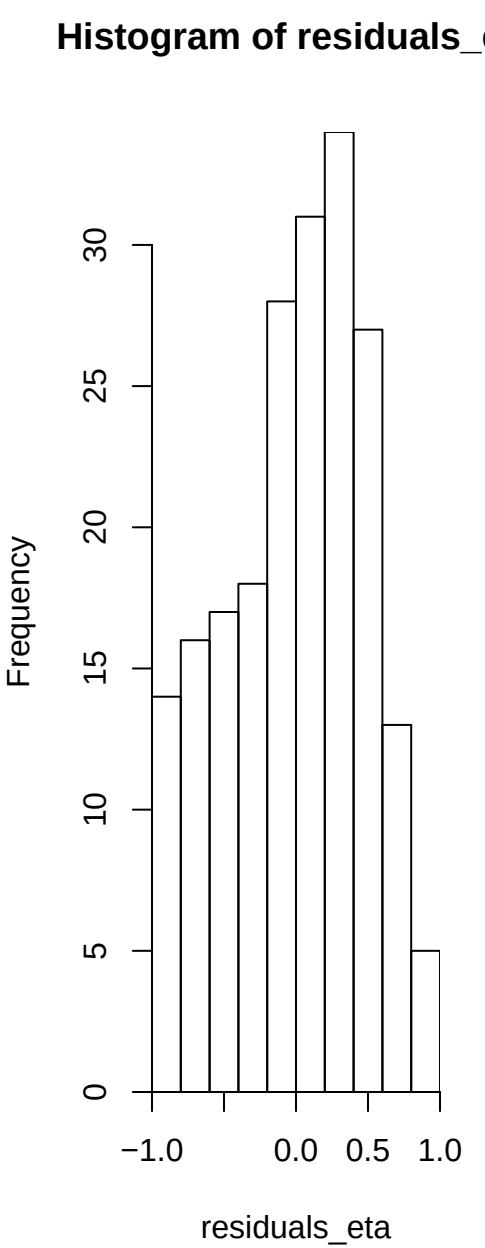
riginal data #

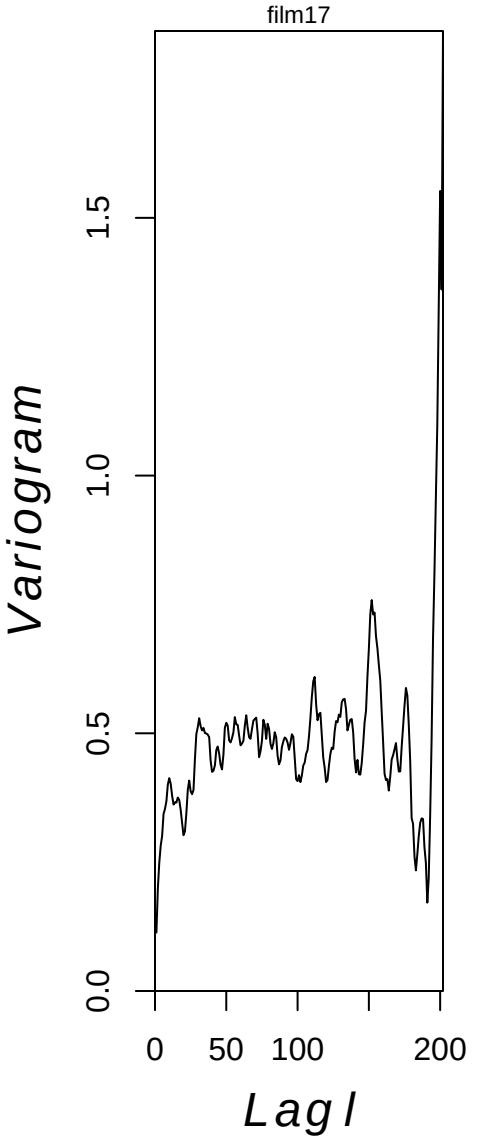

Series log_aeta
Partial ACF
0.6
0.4
0.2
0.0
−0.2
20
60
100
Lag

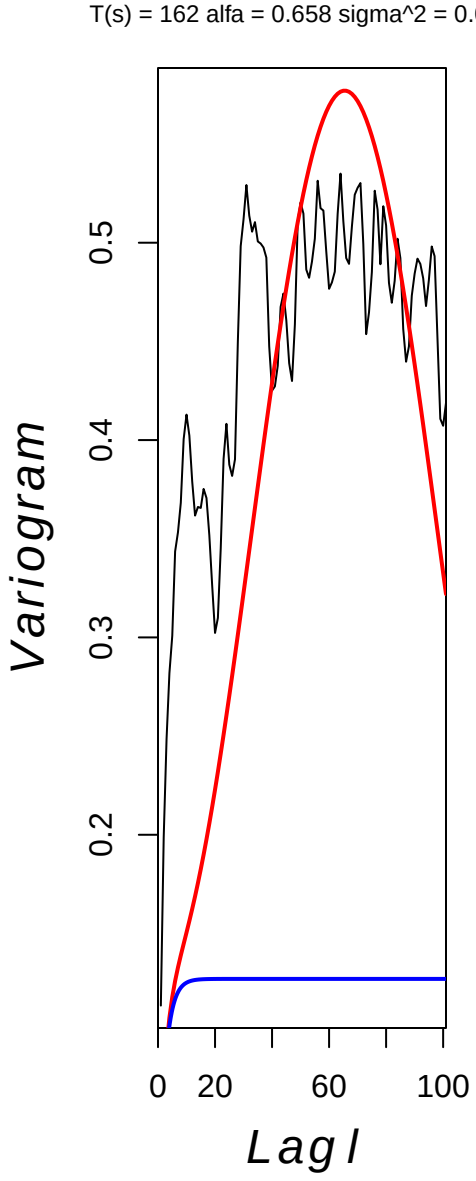

Series log_aeta
ACF
1.0
0.8
0.6
0.4
0.2
0.0
0
20
60
100
Lag

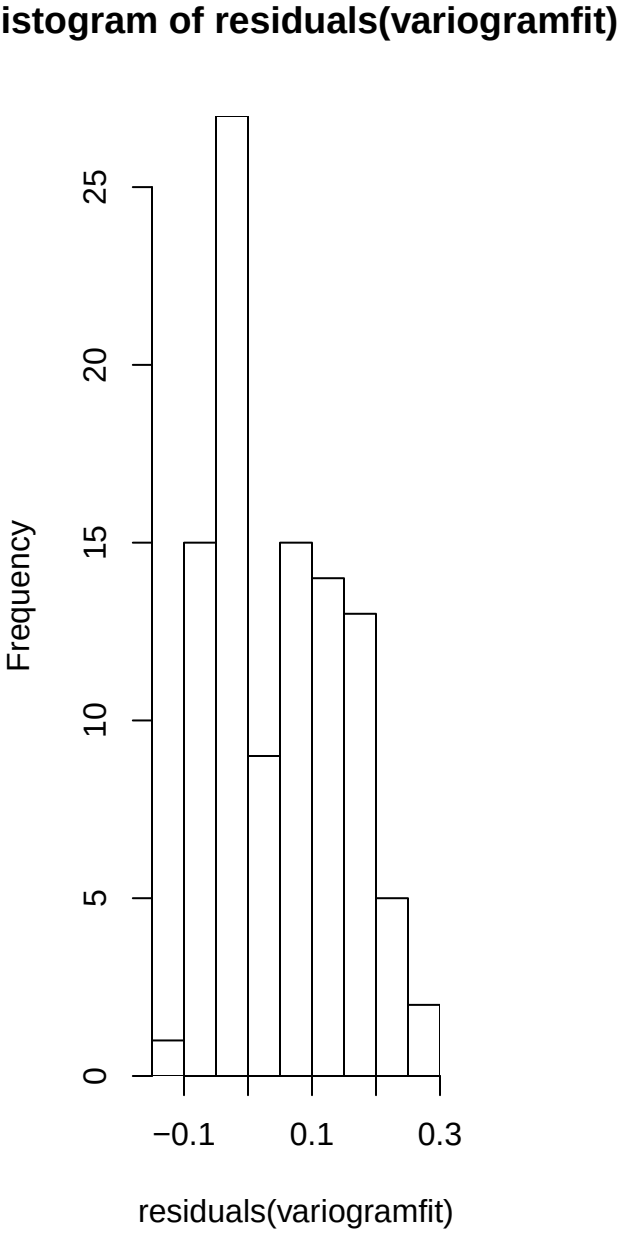

tau = 5.44 T = 138.6
acf_value
0.0
0.5
1.0
0
10
20
30
lag_acf

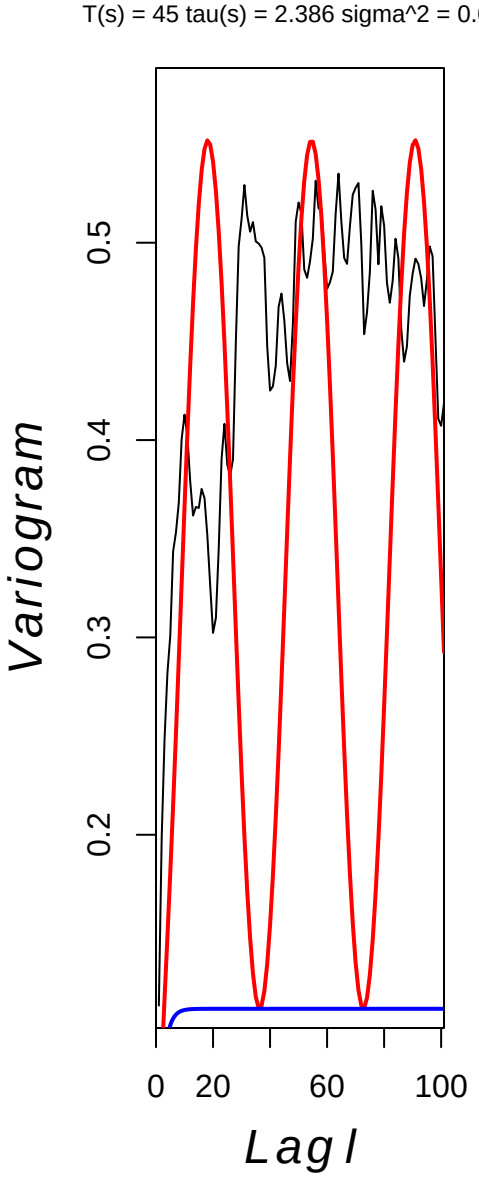

eta> 11.32 st dev+6.91 st dev−4.2930
η(t)
1.0
1.5
2.0
2.5
3.0
3.5
4.0
0
50
150
250
t(s)

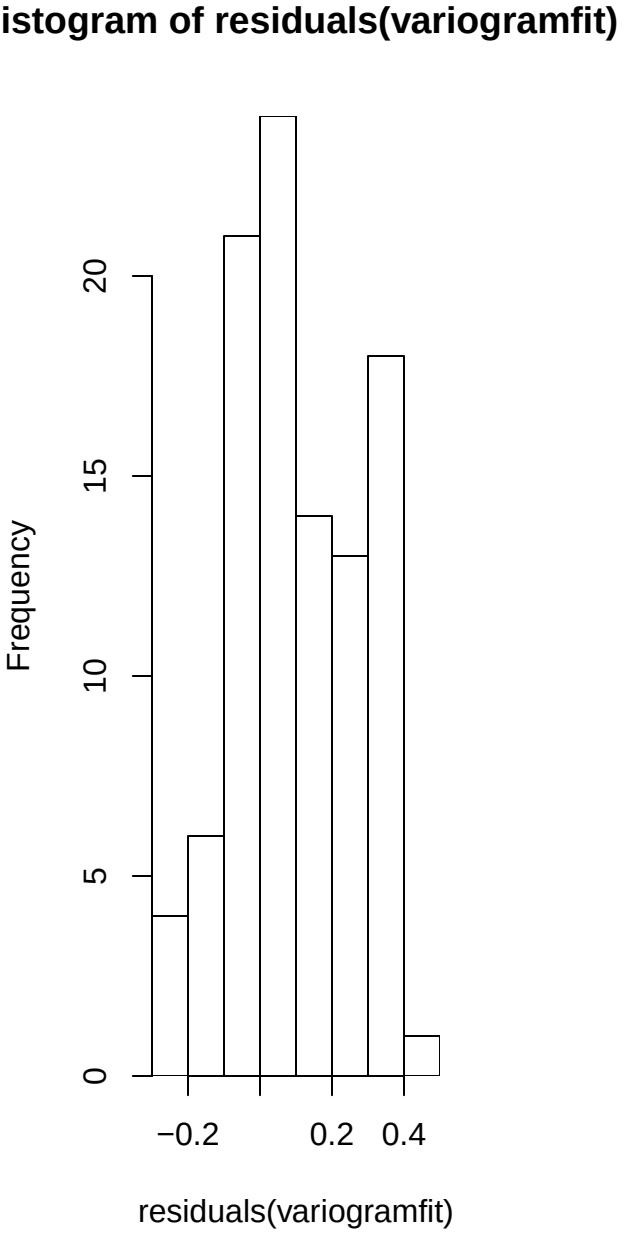

Histogram of residuals_eta
Frequency
0
5
10
15
20
25
30
−1.0
0.0
0.5
1.0
residuals_eta

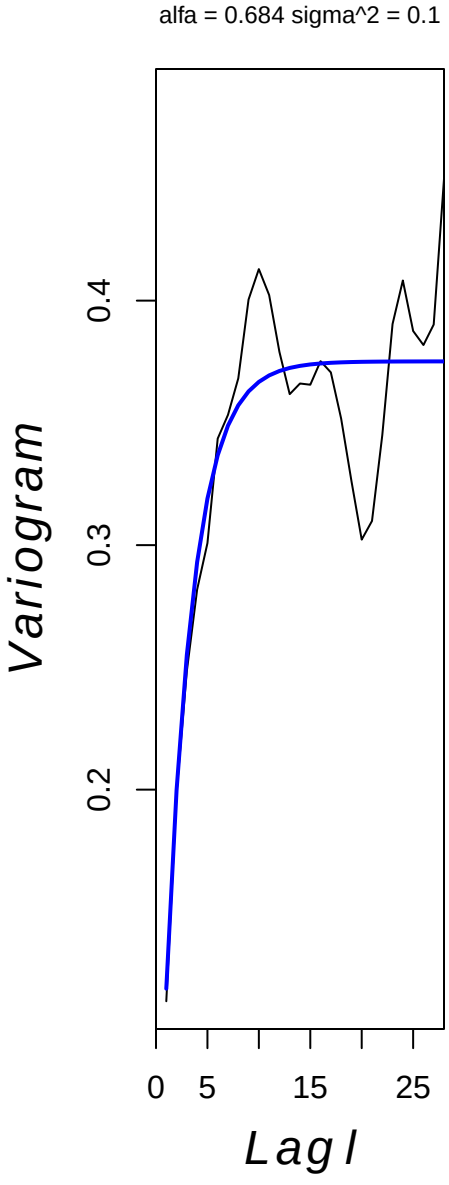

film17
Variogram
0.0
0.5
1.0
1.5
0
50
100
200
Lag l

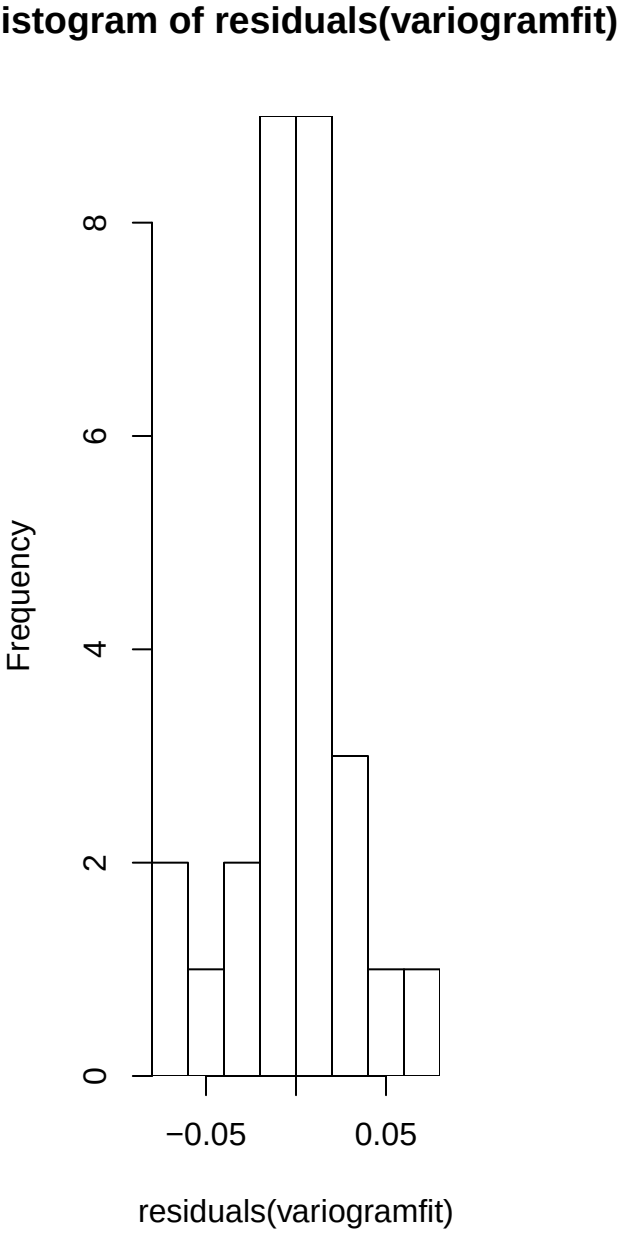

T(s) = 162 alfa = 0.658 sigma^2 = 0.036
Variogram
0.2
0.3
0.4
0.5
0
20
60
100
Lag l

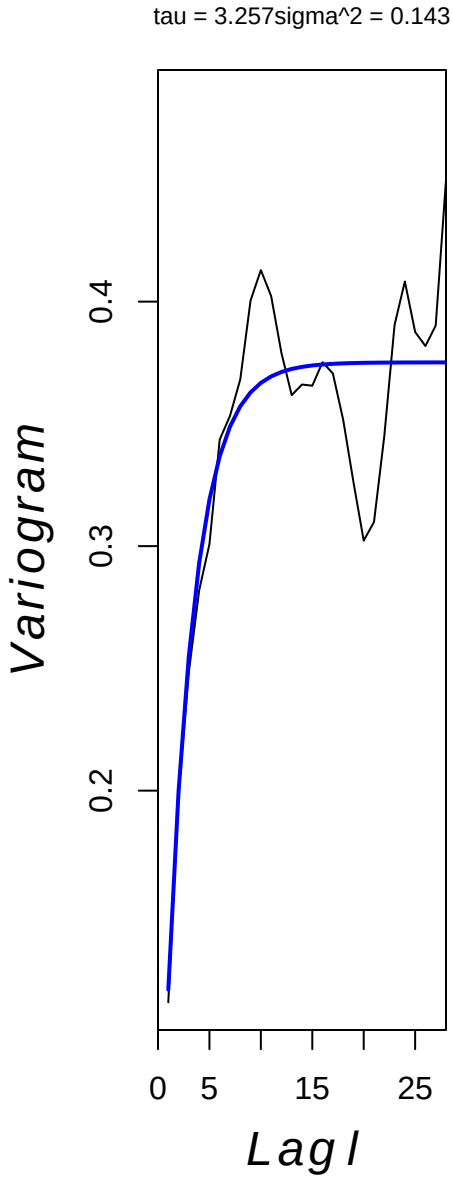

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
20
25
−0.1
0.1
0.3
residuals(variogramfit)

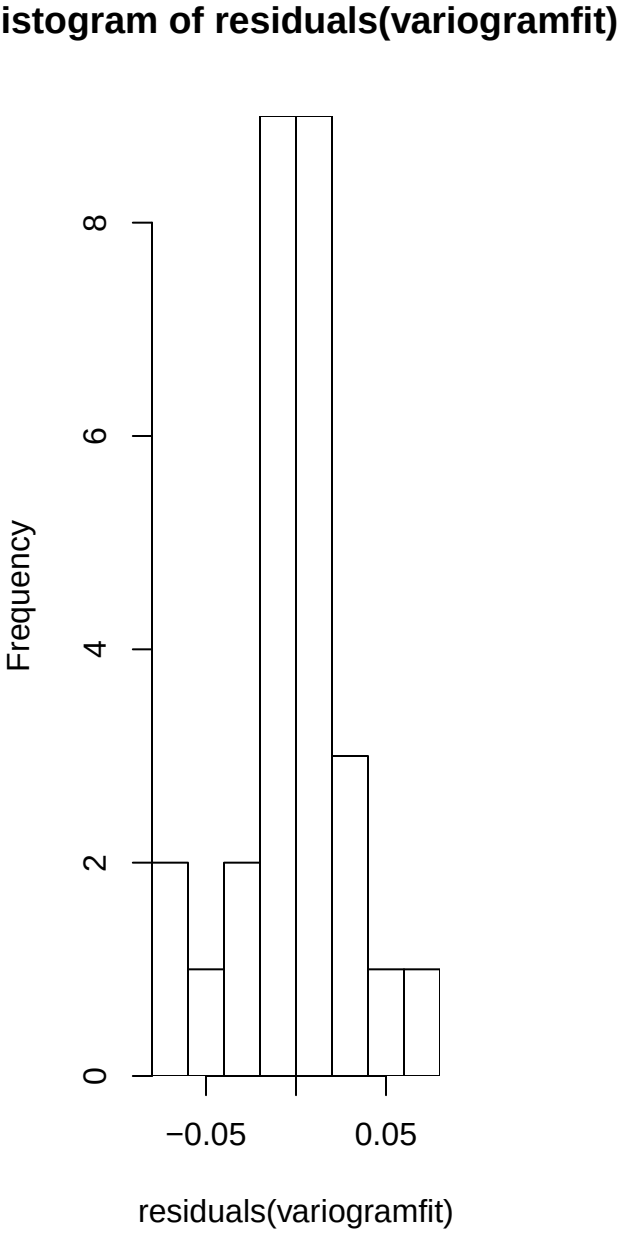

T(s) = 45 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.2
0.3
0.4
0.5
0
20
60
100
Lag l

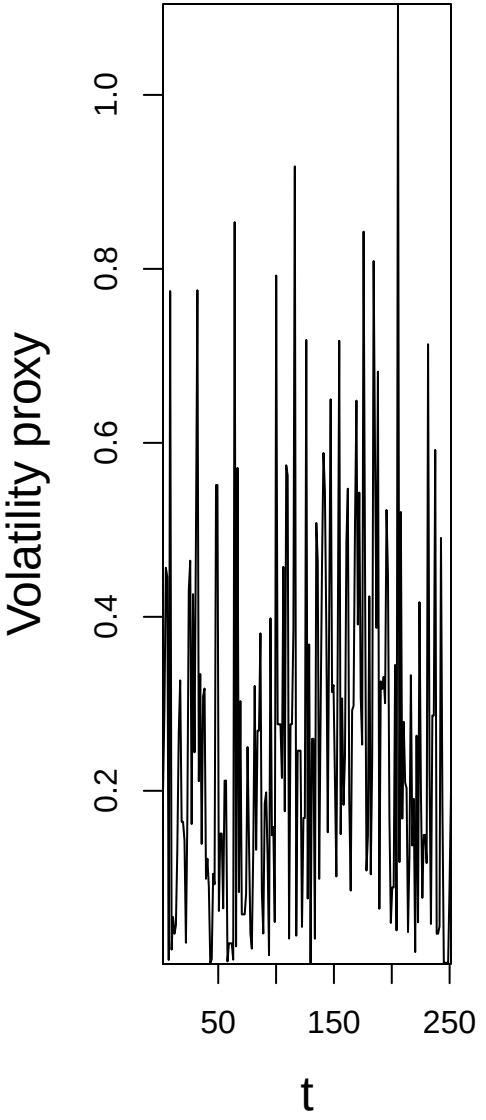

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
20
−0.2
0.2
0.4
residuals(variogramfit)

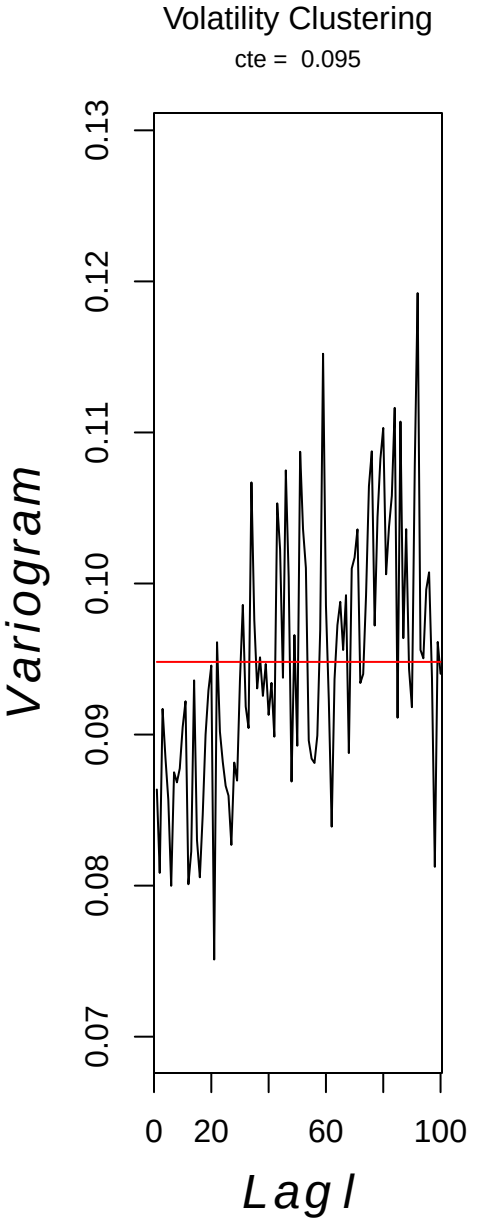

alfa = 0.684 sigma^2 = 0.1
Variogram
0.2
0.3
0.4
0
5
15
25
Lag l

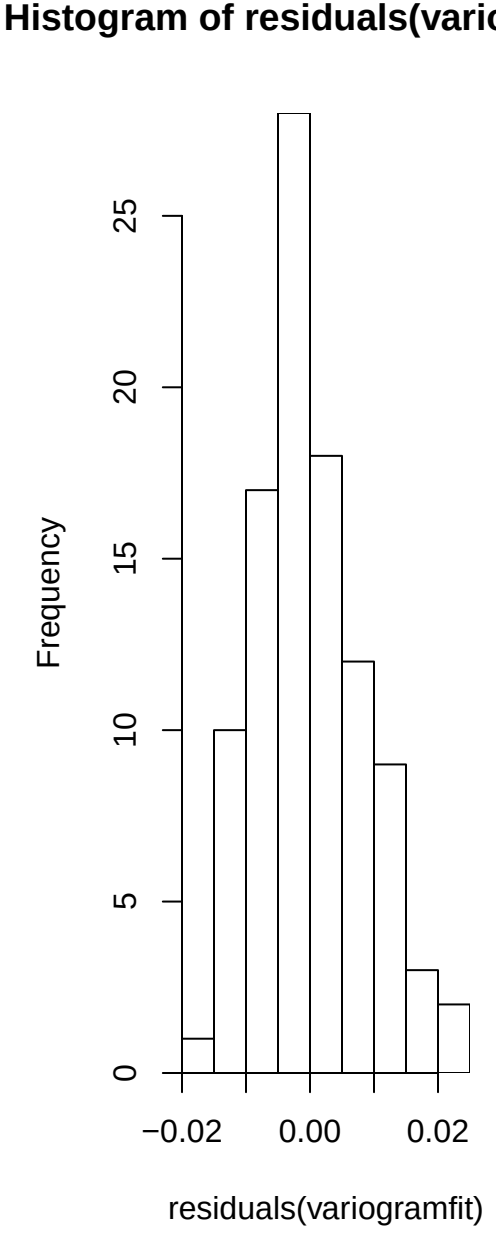

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
−0.05
0.05
residuals(variogramfit)

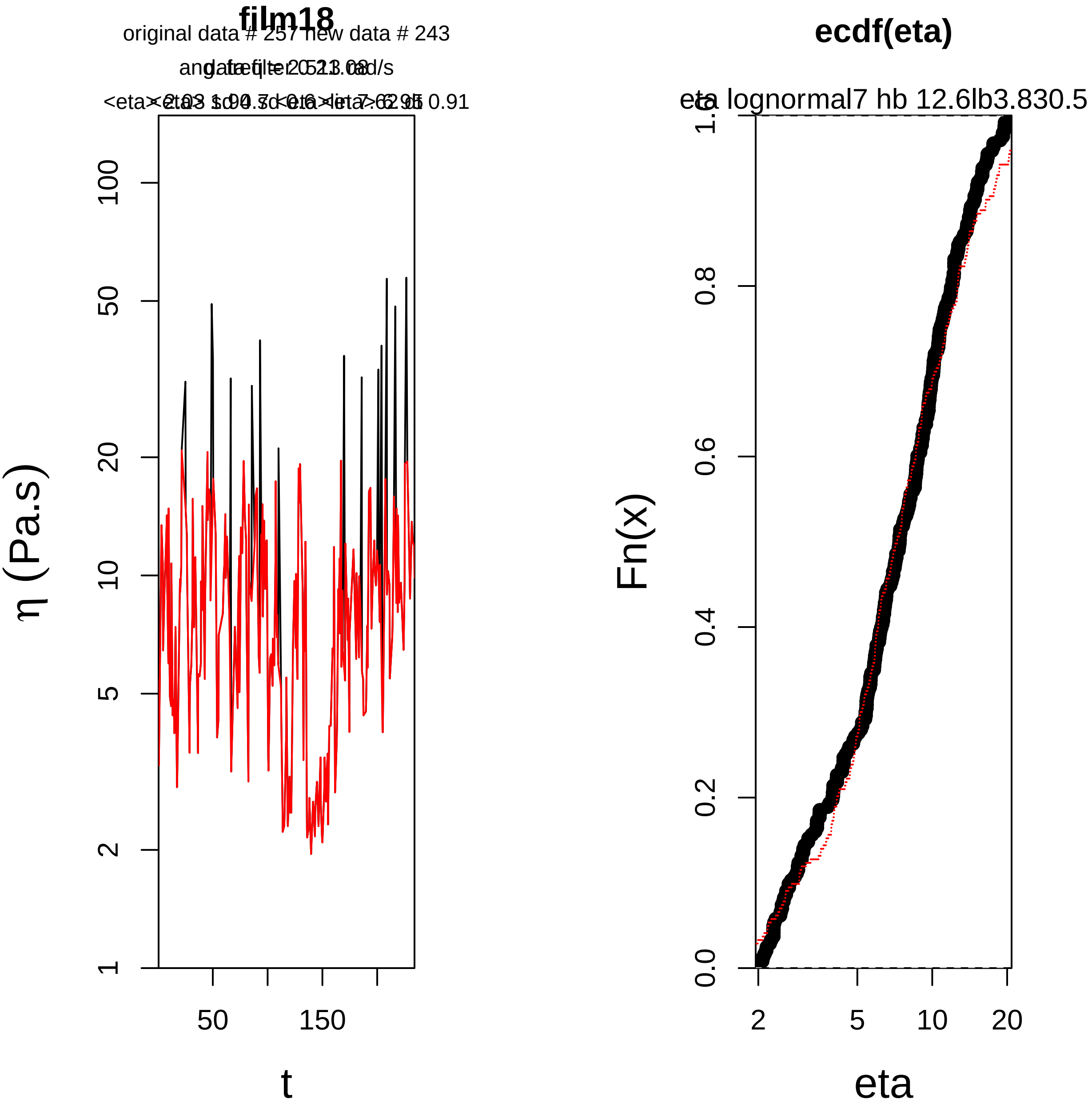

tau = 3.257sigma^2 = 0.143
Variogram
0.2
0.3
0.4
0
5
15
25
Lag l

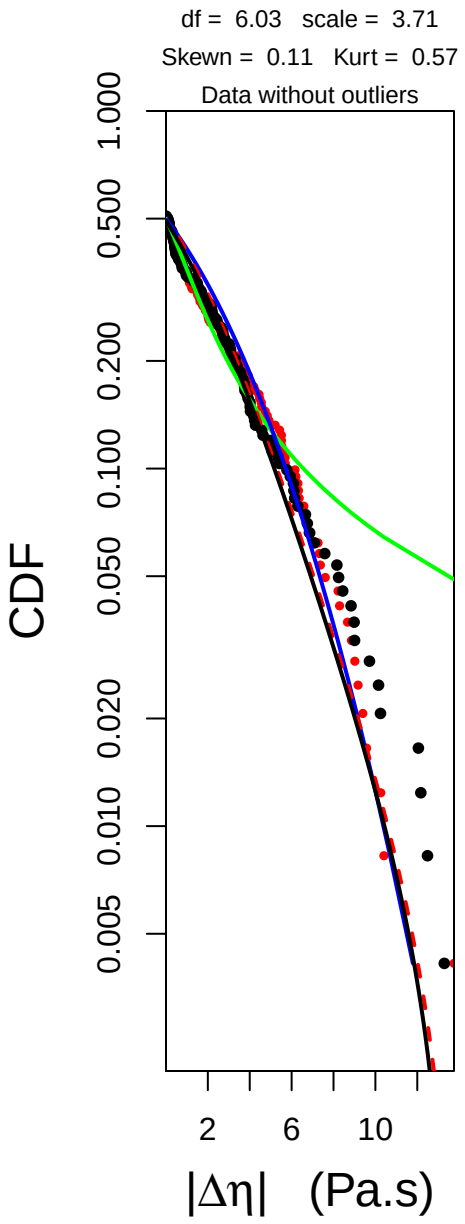

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
−0.05
0.05
residuals(variogramfit)

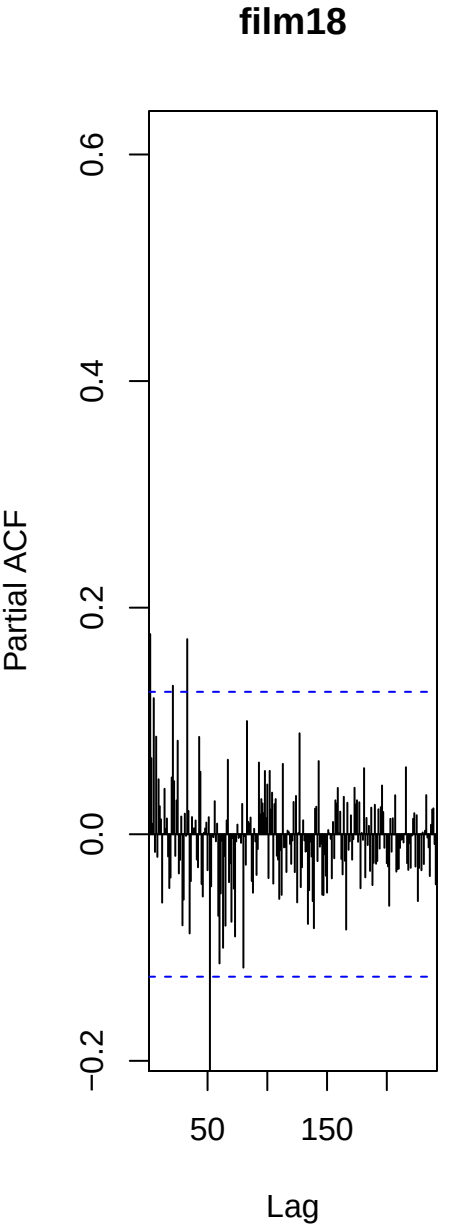

Volatility proxy
0.2
0.4
0.6
0.8
1.0
50
150
250
t

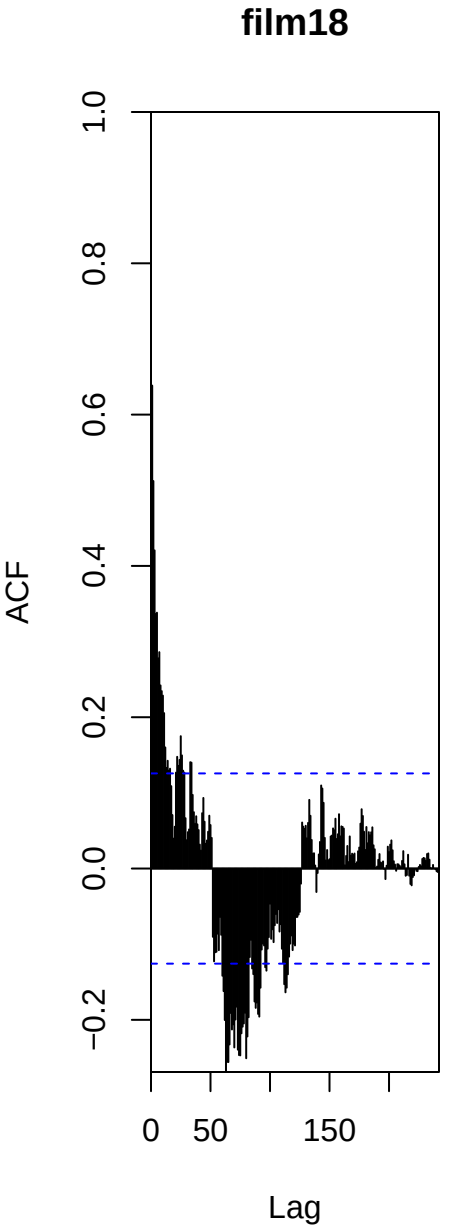

Volatility Clustering
cte = 0.095
Variogram
0.07
0.08
0.09
0.10
0.11
0.12
0.13
0
20
60
100
Lag l

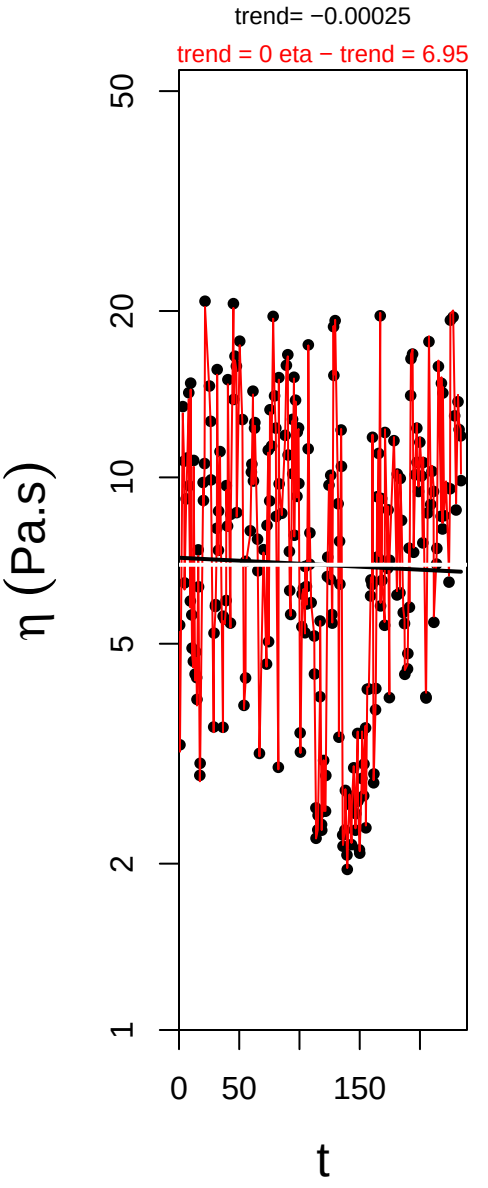

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
20
25
−0.02
0.00
0.02
residuals(variogramfit)

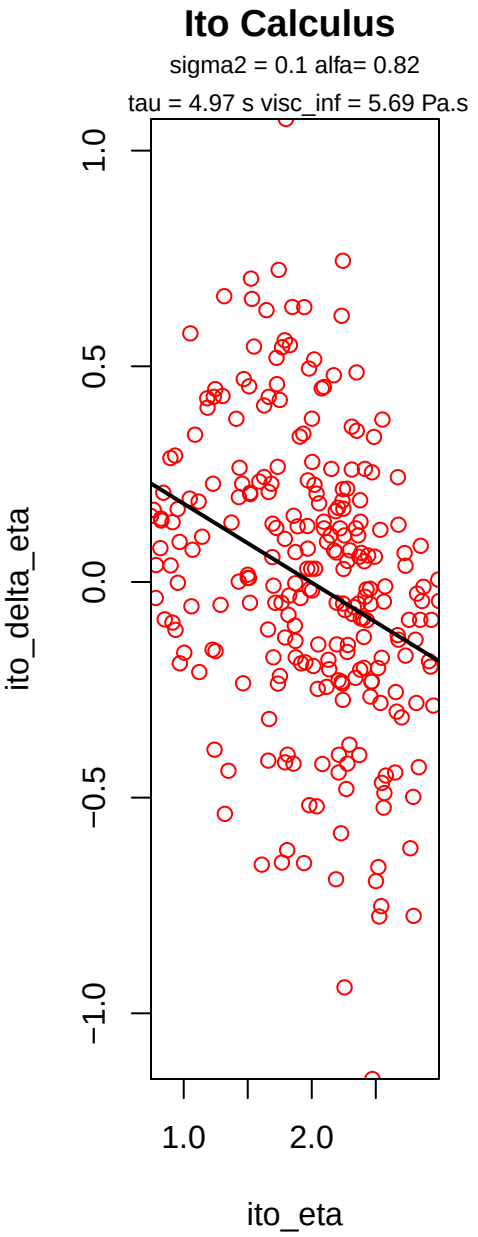

film18
original data # 257 new data # 243
η (Pa.s)
t
1
2
5
10
20
50
100
50
150
ecdf(eta)
eta lognormal7 hb 12.6lb3.830.5
Fn(x)
eta
0.0
0.2
0.4
0.6
0.8
2
5
10
20

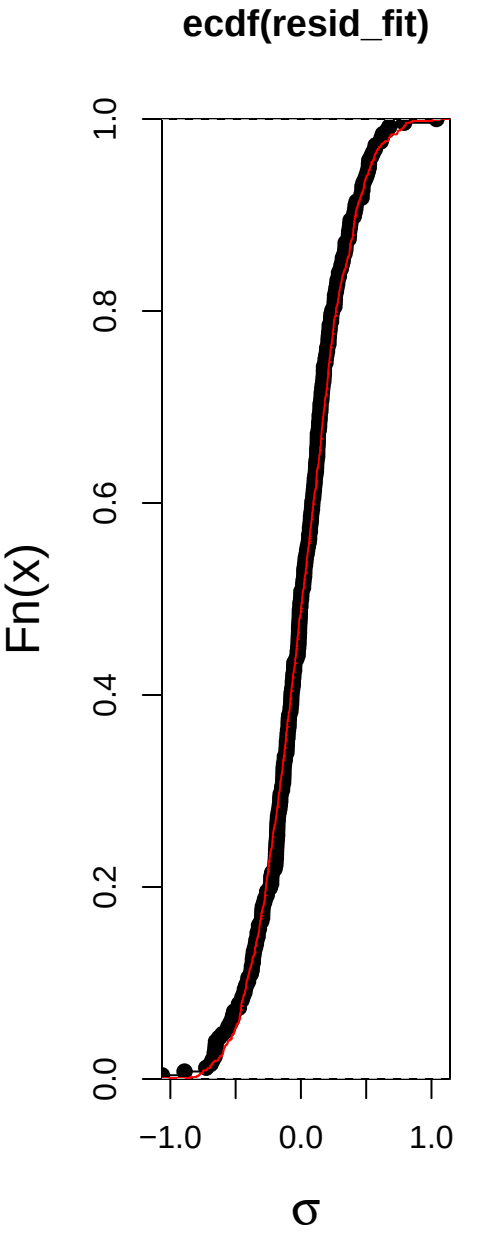

df = 6.03 scale = 3.71
Skewn = 0.11 Kurt = 0.57
Data without outliers
CDF
1.000
0.500
0.200
0.100
0.050
0.020
0.010
0.005
2
6
10
|Δη| (Pa.s)

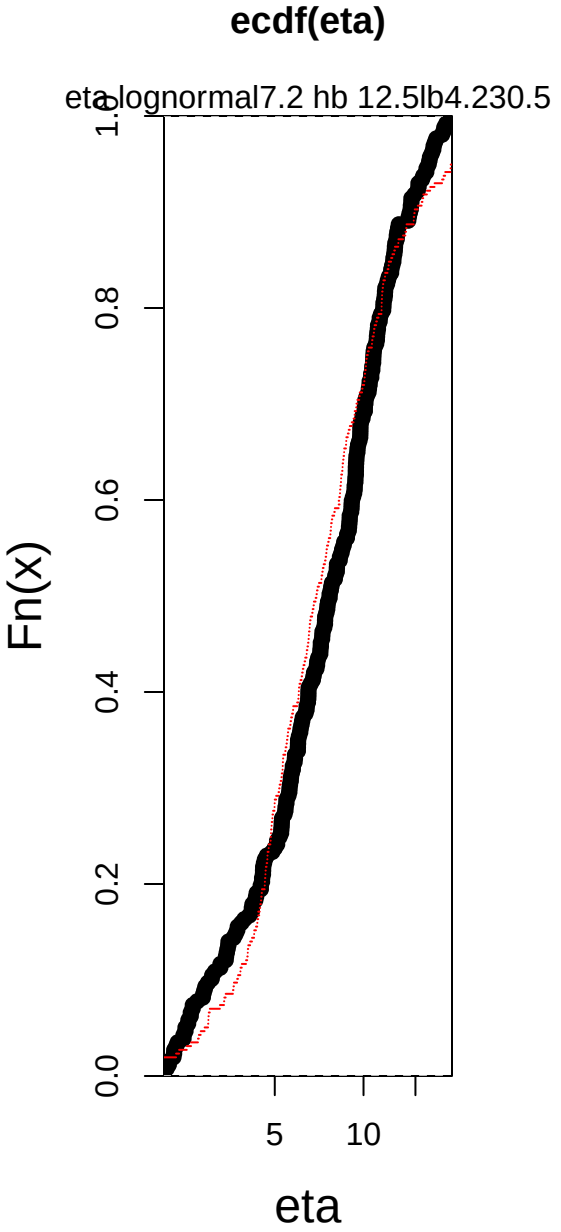

film18
Partial ACF
0.6
0.4
0.2
0.0
−0.2
50
150
Lag

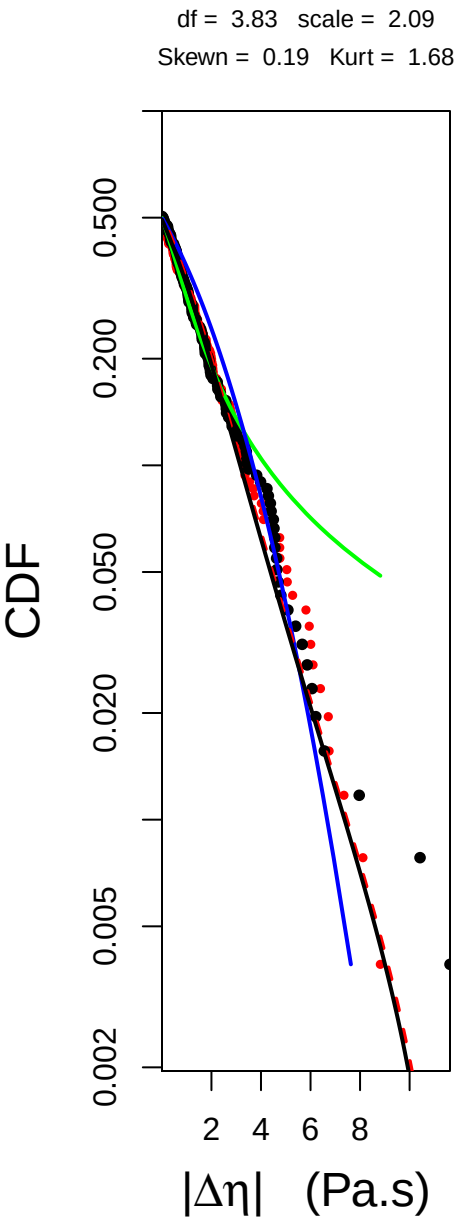

film18
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
50
150
Lag


trend= −0.00025
trend = 0 eta − trend = 6.95
η (Pa.s)
50
20
10
5
2
1
0
50
150
t

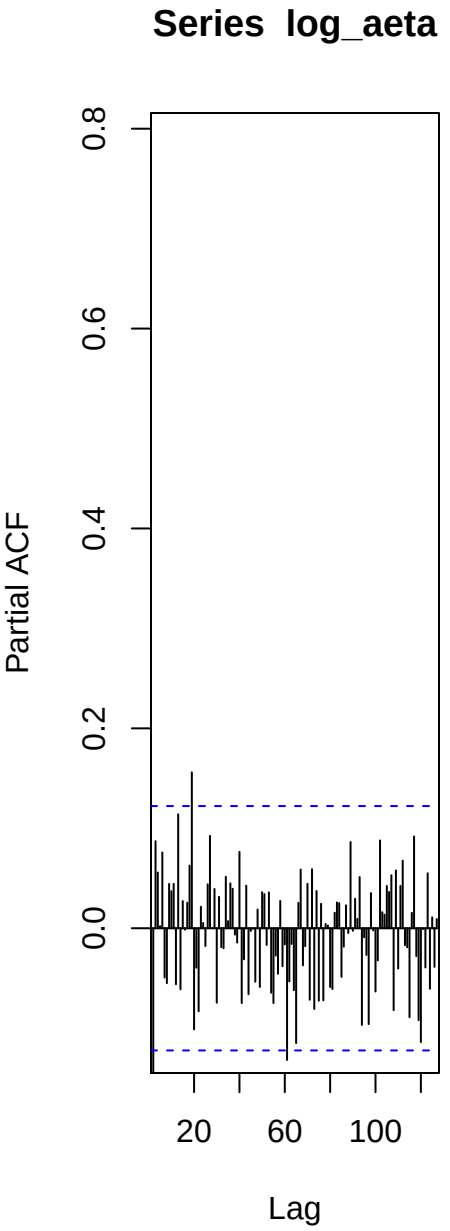

Ito Calculus
sigma2 = 0.1 alfa= 0.82
tau = 4.97 s visc_inf = 5.69 Pa.s
ito_delta_eta
ito_eta
1.0
0.5
0.0
−0.5
−1.0
1.0
2.0

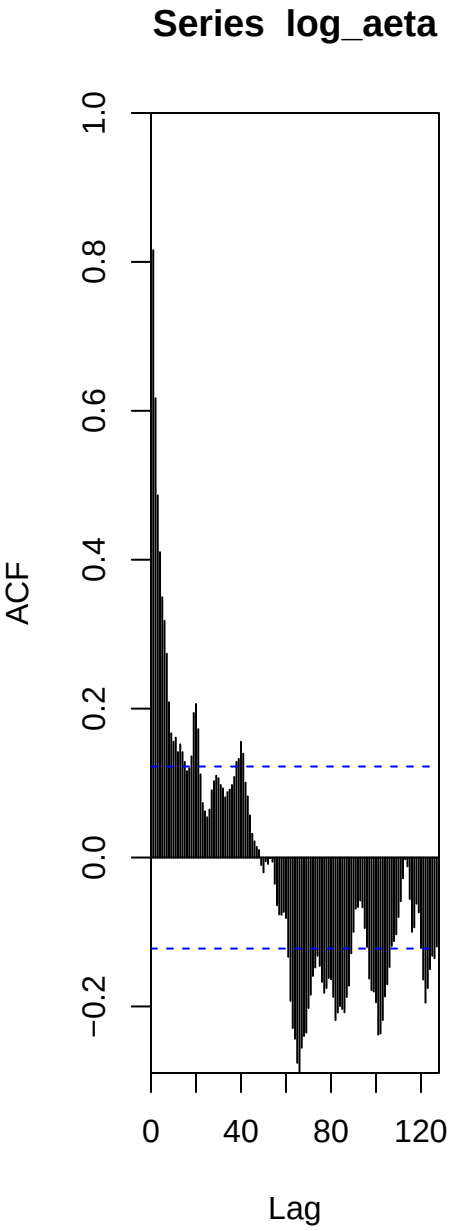

ecdf(resid_fit)
Fn(x)
σ
0.0
0.2
0.4
0.6
0.8
1.0
−1.0
0.0
1.0

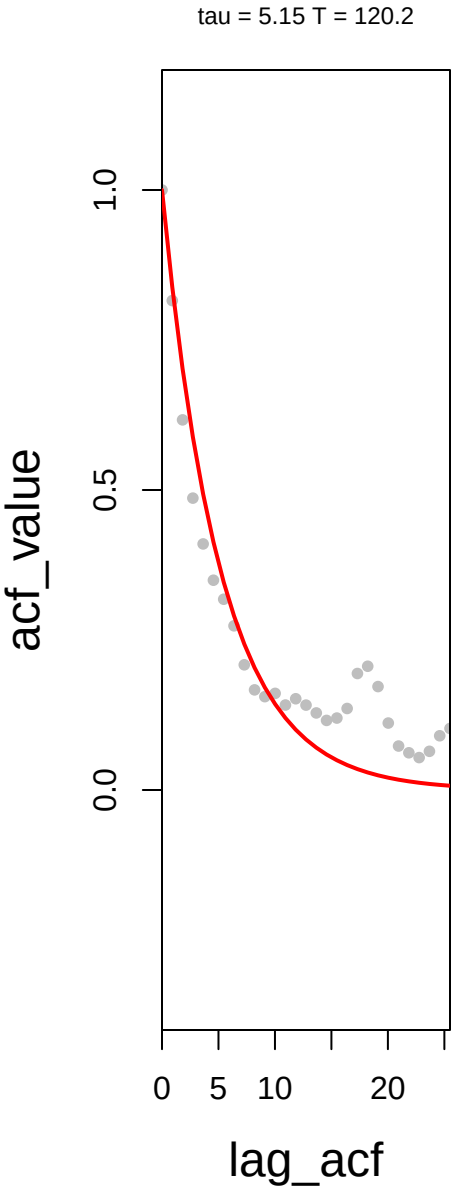


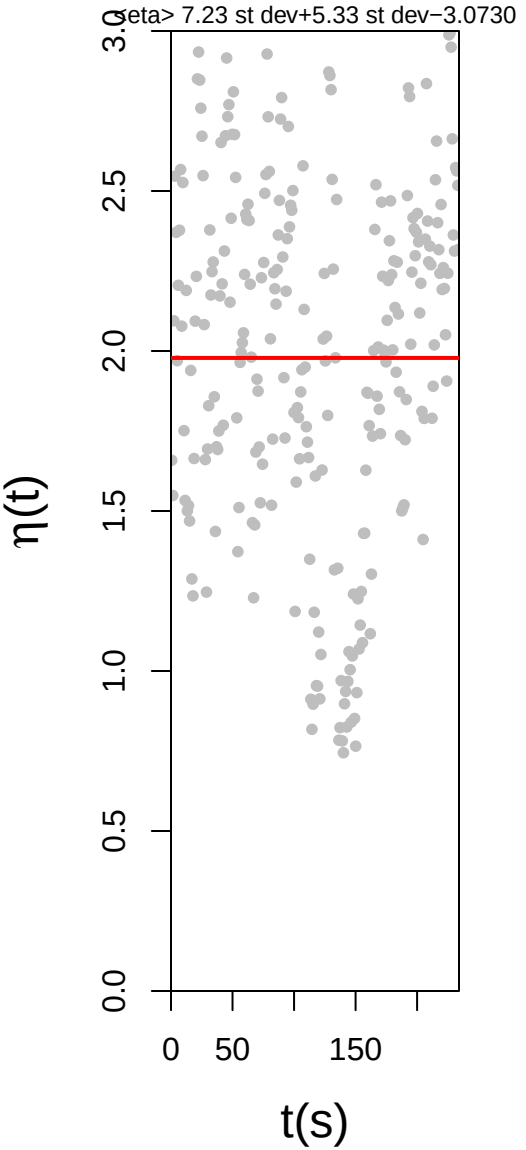


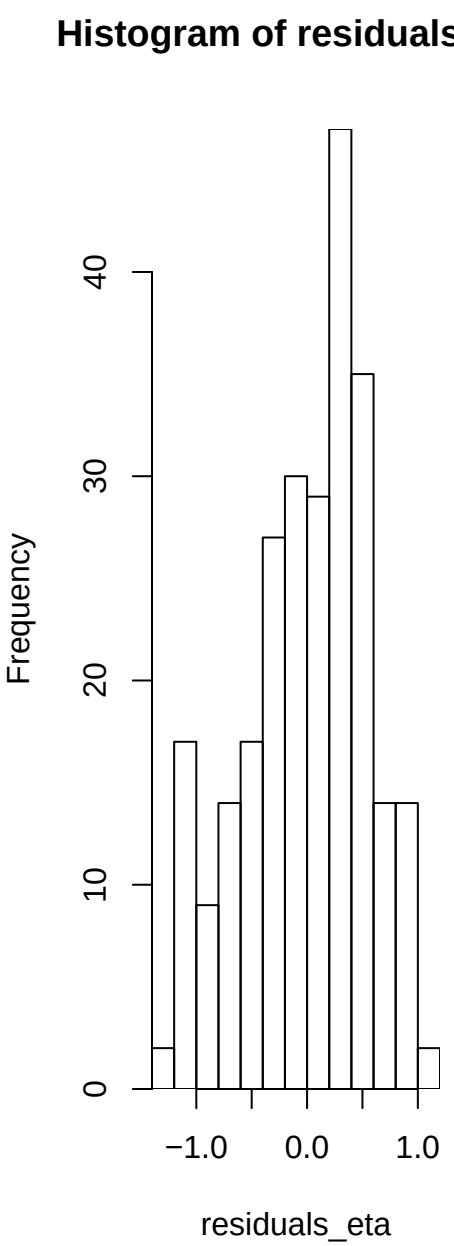
riginal data #

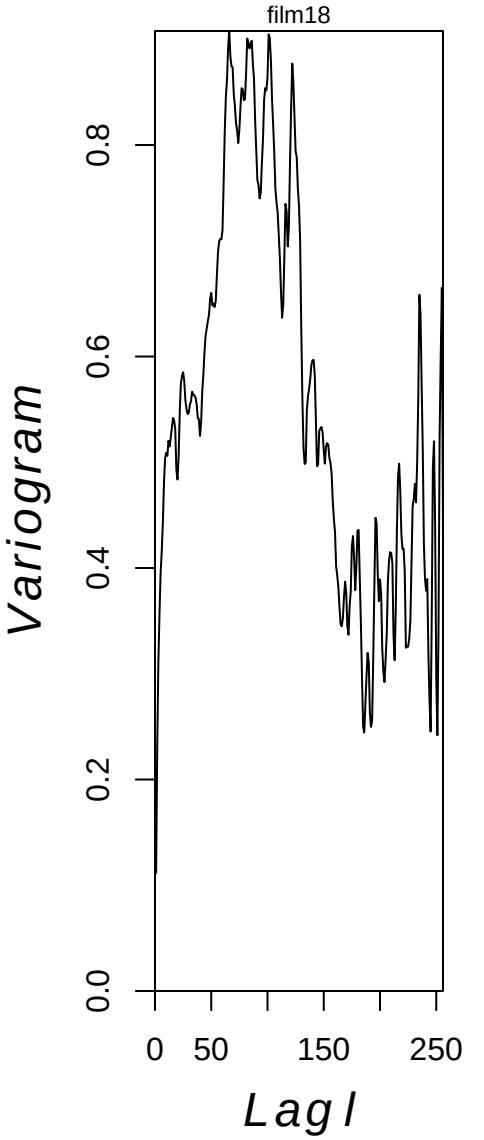

Series log_aeta
Partial ACF
0.8
0.6
0.4
0.2
0.0
20
60
100
Lag

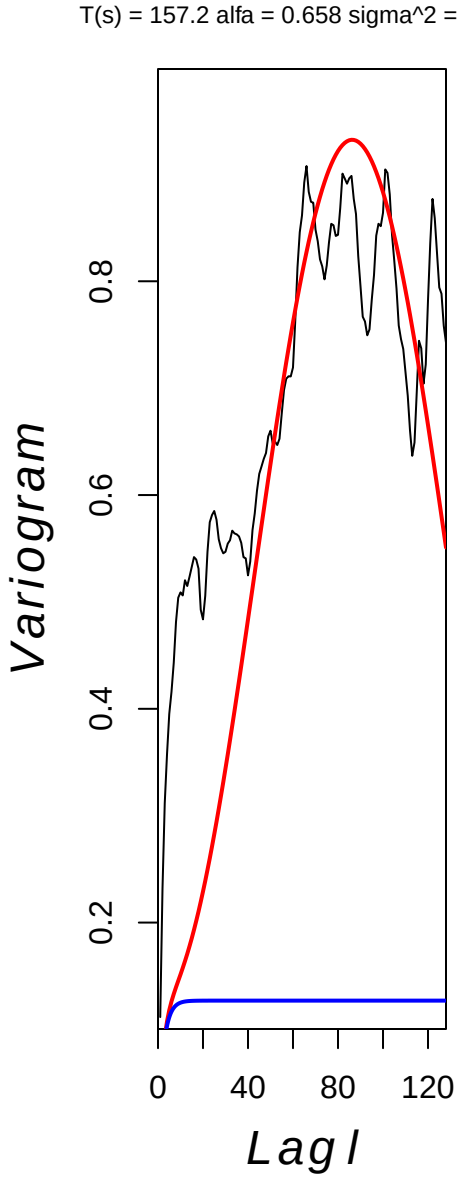

Series log_aeta
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
40
80
120
Lag

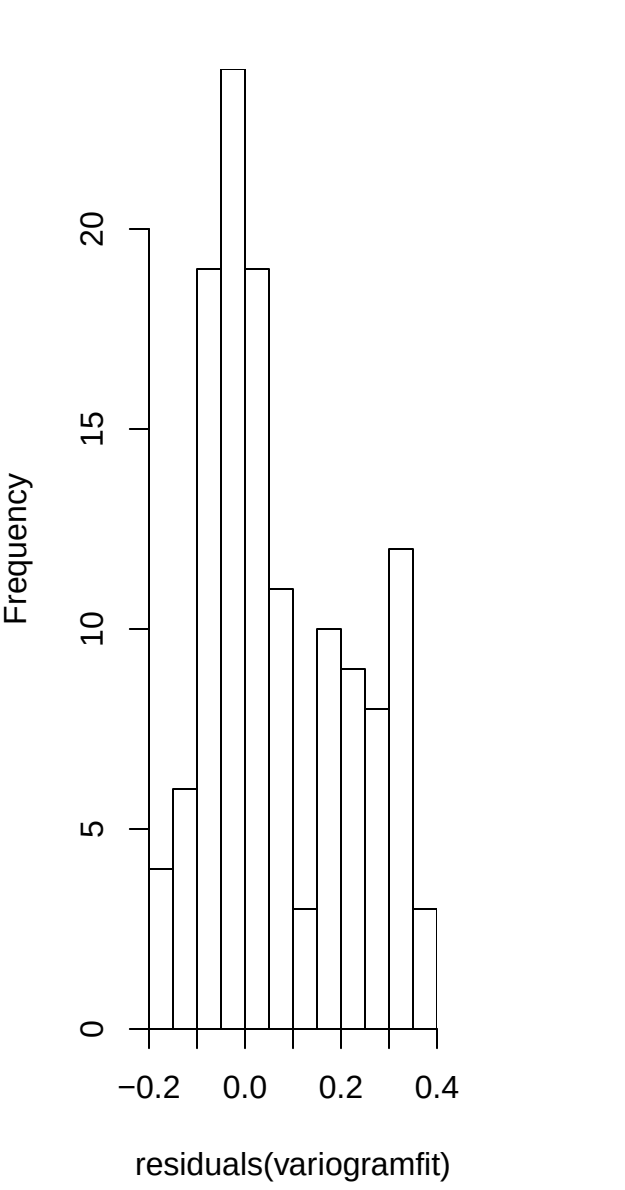

tau = 5.15 T = 120.2
acf_value
0.0
0.5
1.0
0
5
10
20
lag_acf

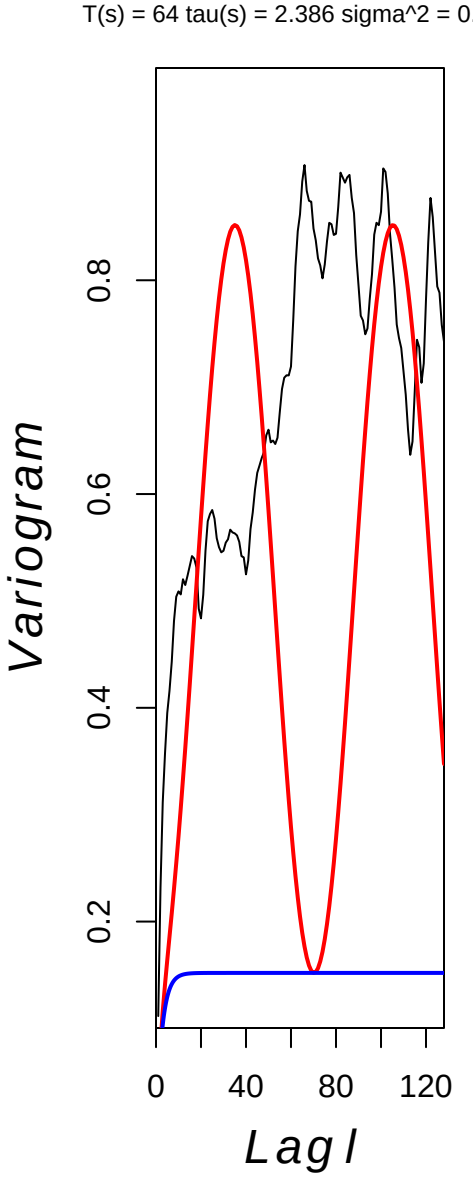

eta> 7.23 st dev+5.33 st dev−3.0730
η(t)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
50
150
t(s)

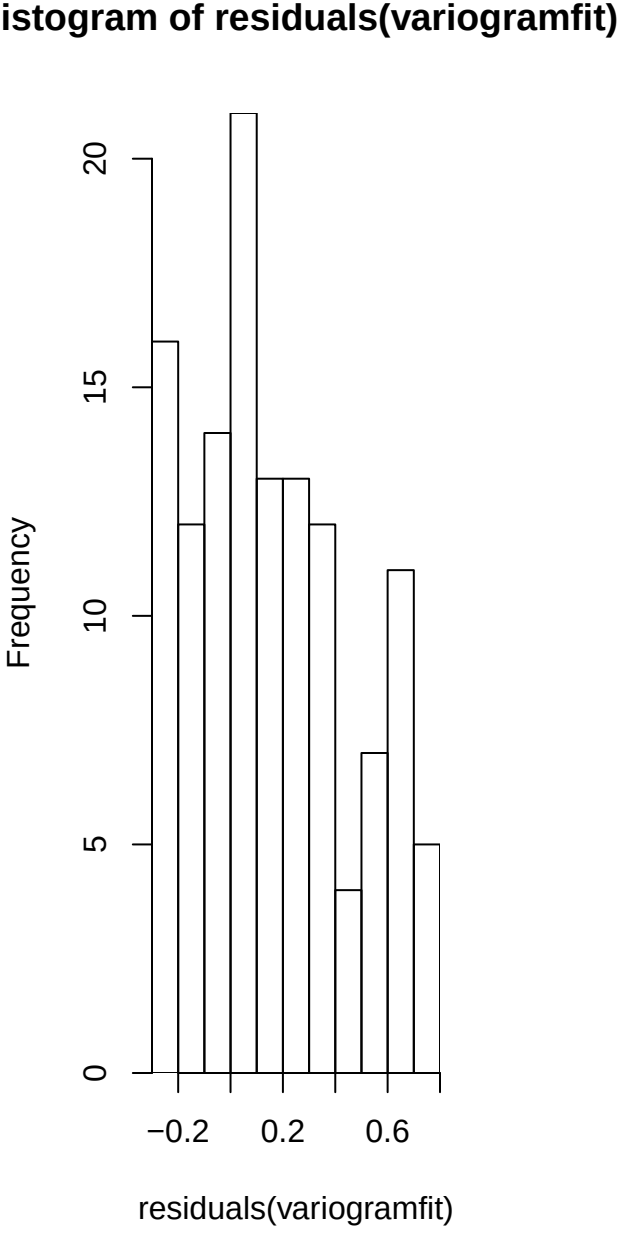

Histogram of residuals_eta
Frequency
0
10
20
30
40
−1.0
0.0
1.0
residuals_eta

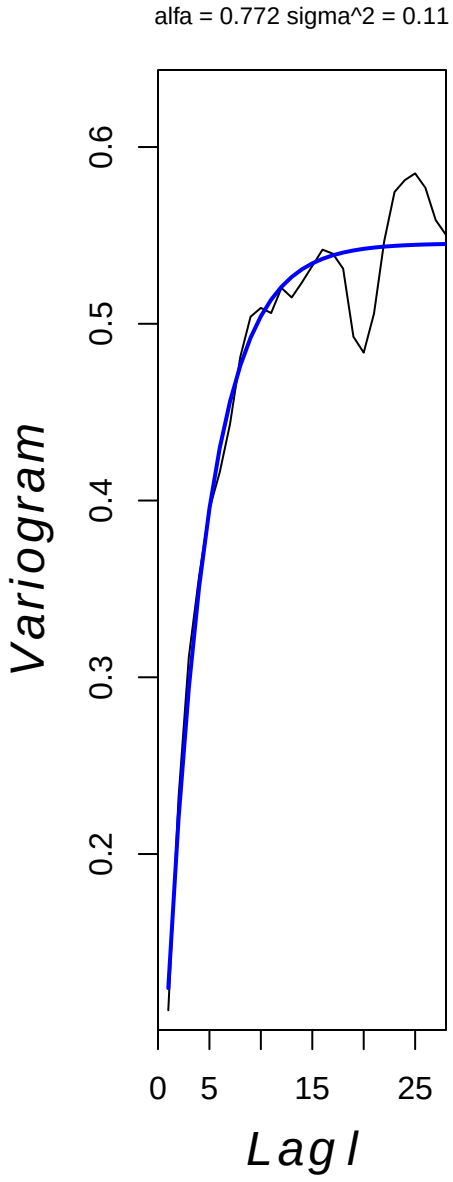

film18
Variogram
0.0
0.2
0.4
0.6
0.8
0
50
150
250
Lag l

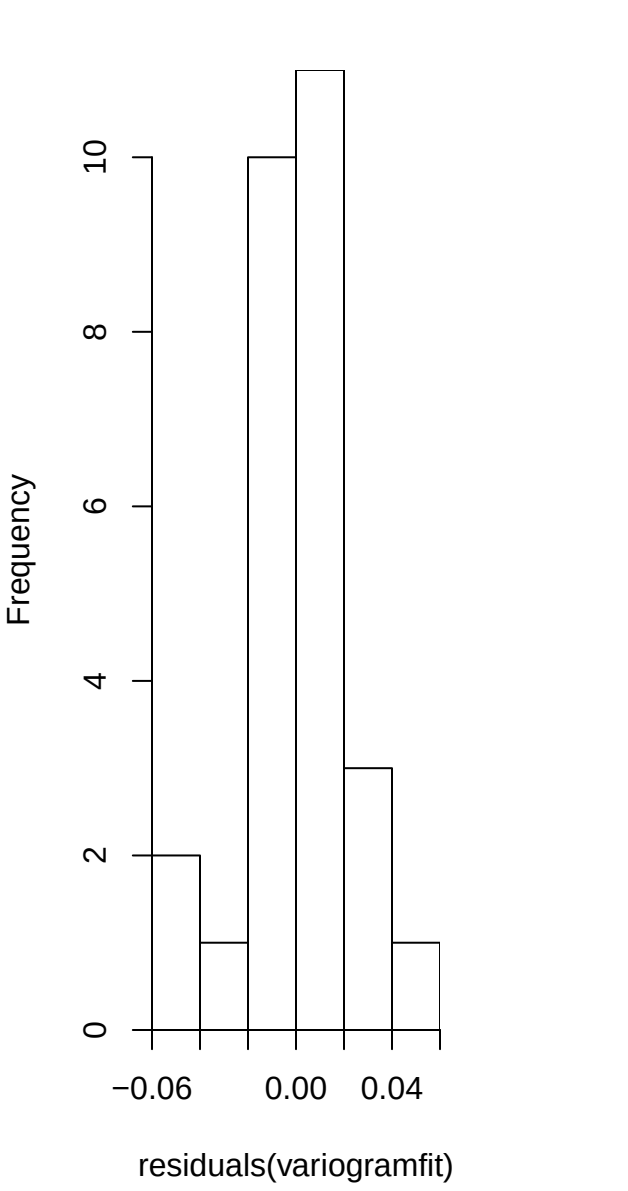

T(s) = 157.2 alfa = 0.658 sigma^2 = 0.036
Variogram
0.2
0.4
0.6
0.8
0
40
80
120
Lag l

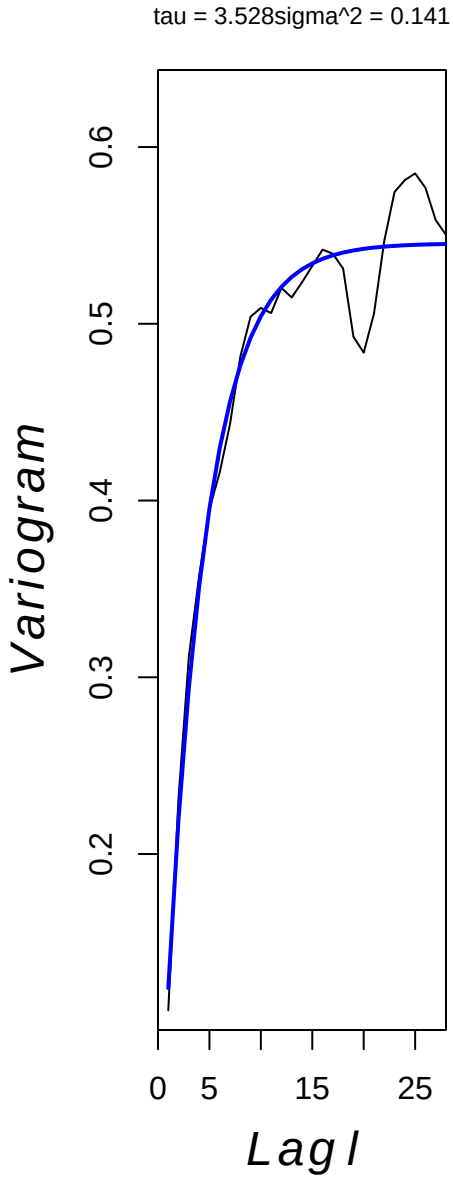

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
20
−0.2
0.0
0.2
0.4
residuals(variogramfit)

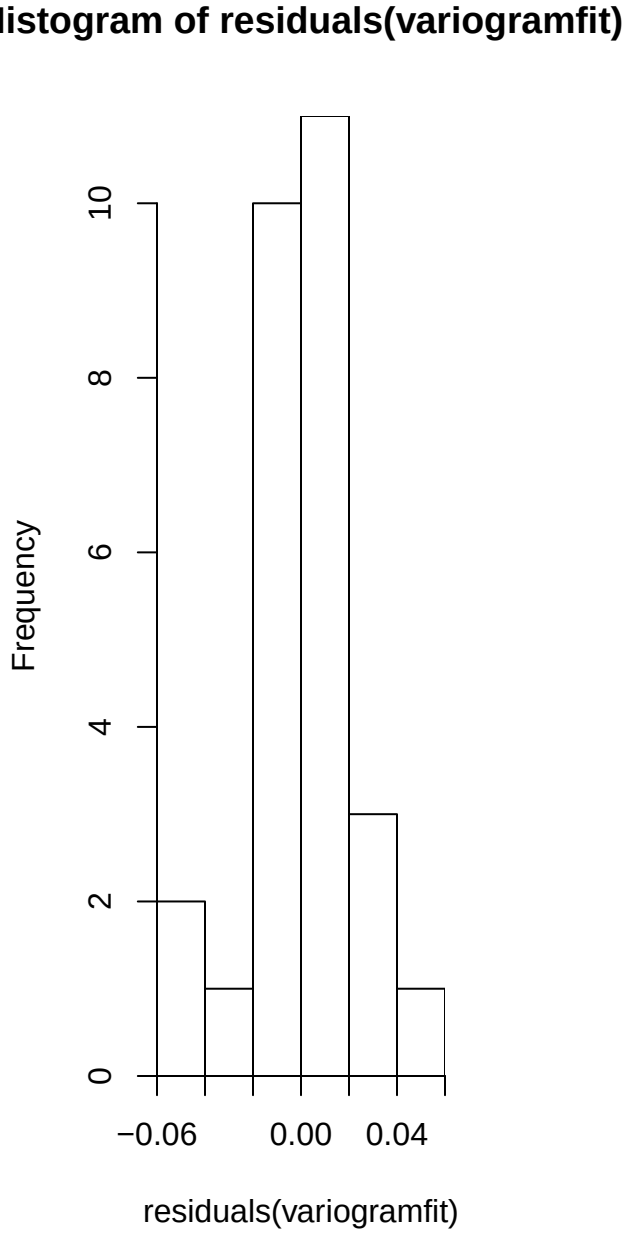

T(s) = 64 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.2
0.4
0.6
0.8
0
40
80
120
Lag l

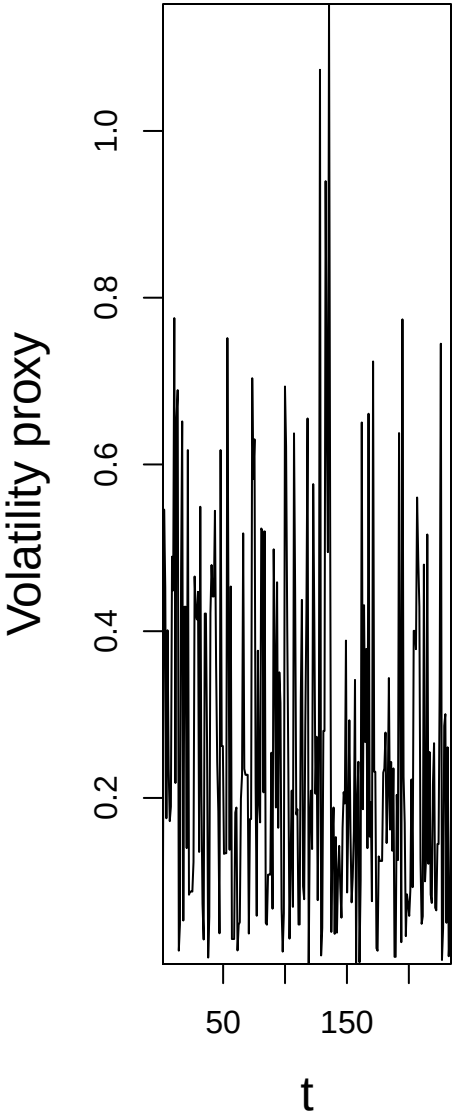

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
20
−0.2
0.2
0.6
residuals(variogramfit)

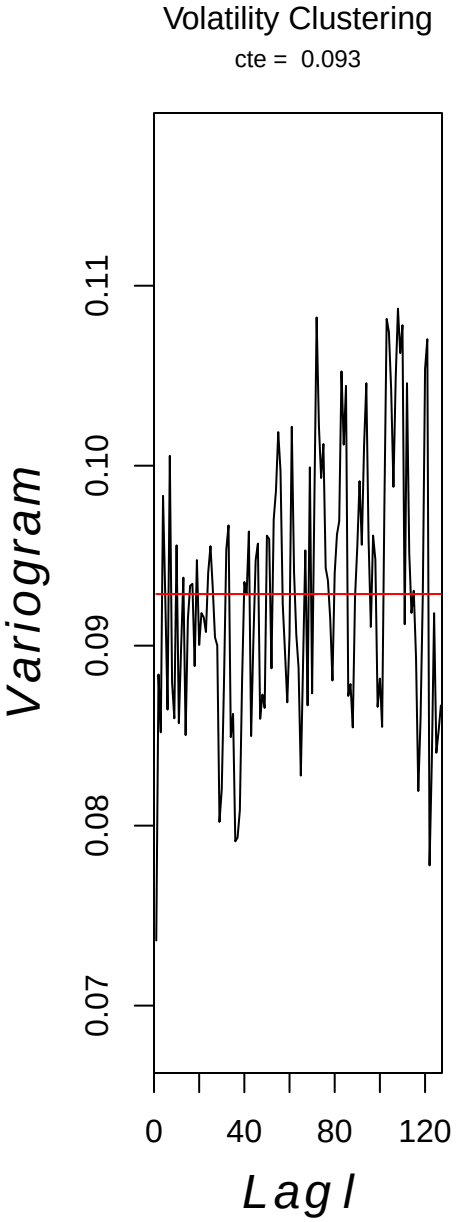

alfa = 0.772 sigma^2 = 0.11
Variogram
0.2
0.3
0.4
0.5
0.6
0
5
15
25
Lag l

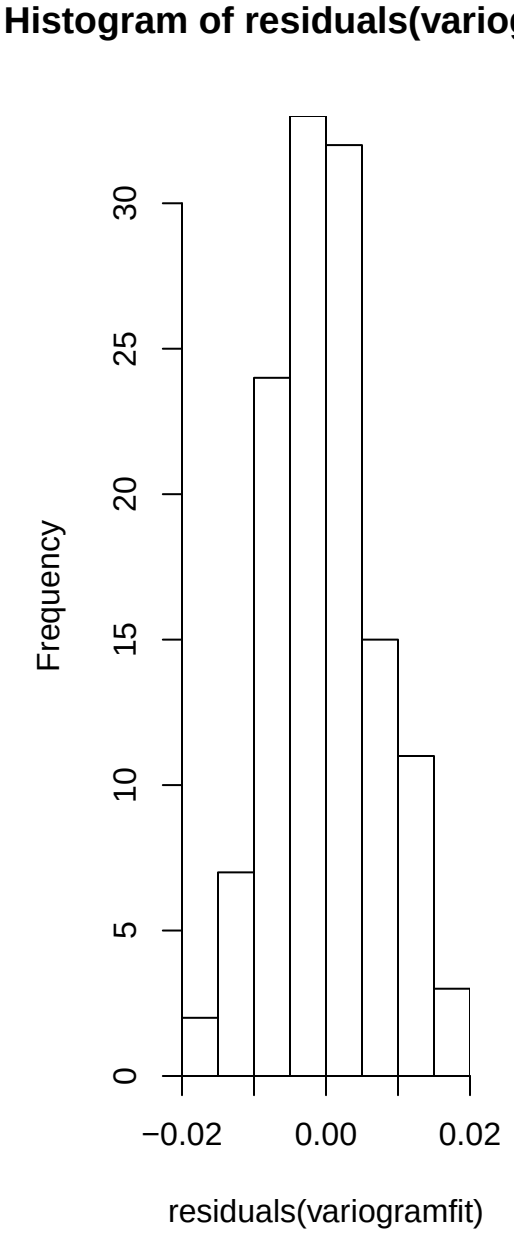

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
−0.06
0.00
0.04
residuals(variogramfit)

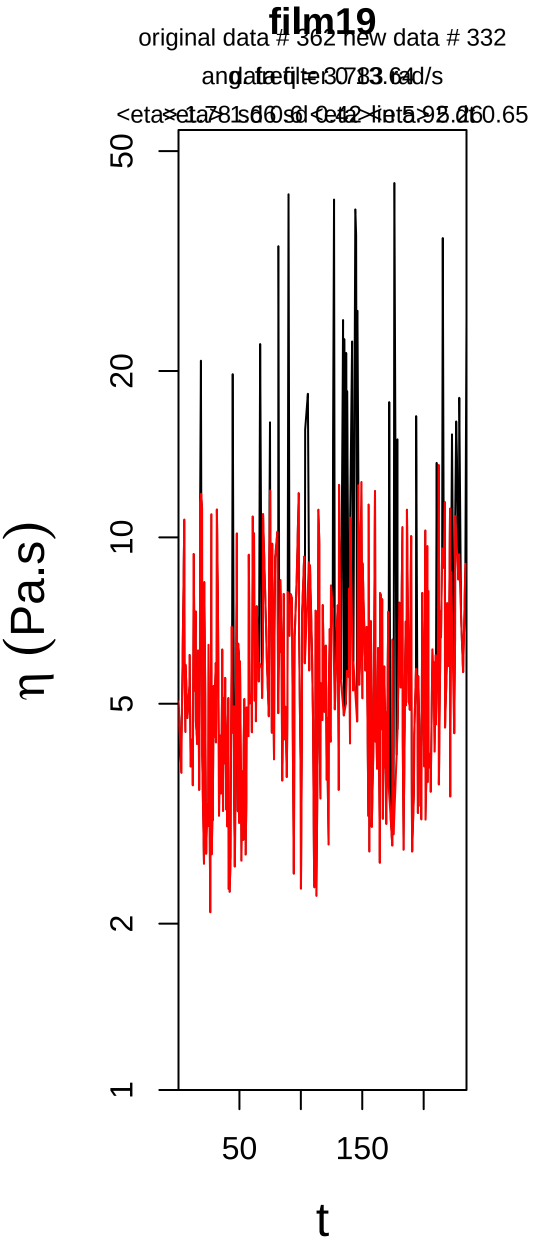

tau = 3.528sigma^2 = 0.141
Variogram
Lag l
0.2
0.3
0.4
0.5
0.6
0
5
15
25

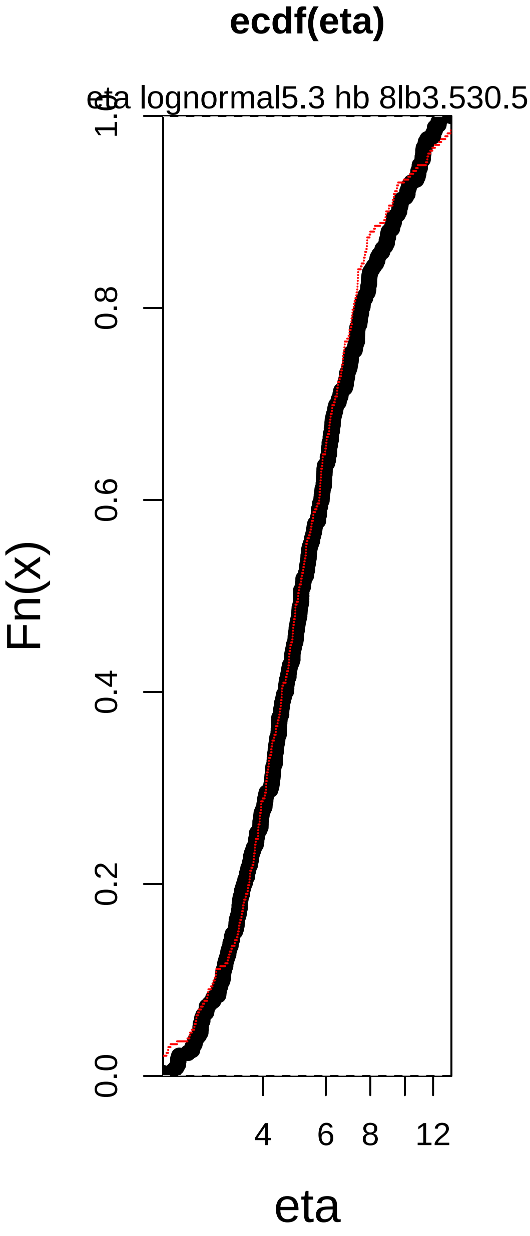

Histogram of residuals(variogramfit)
Frequency
residuals(variogramfit)
0
2
4
6
8
10
−0.06
0.00
0.04

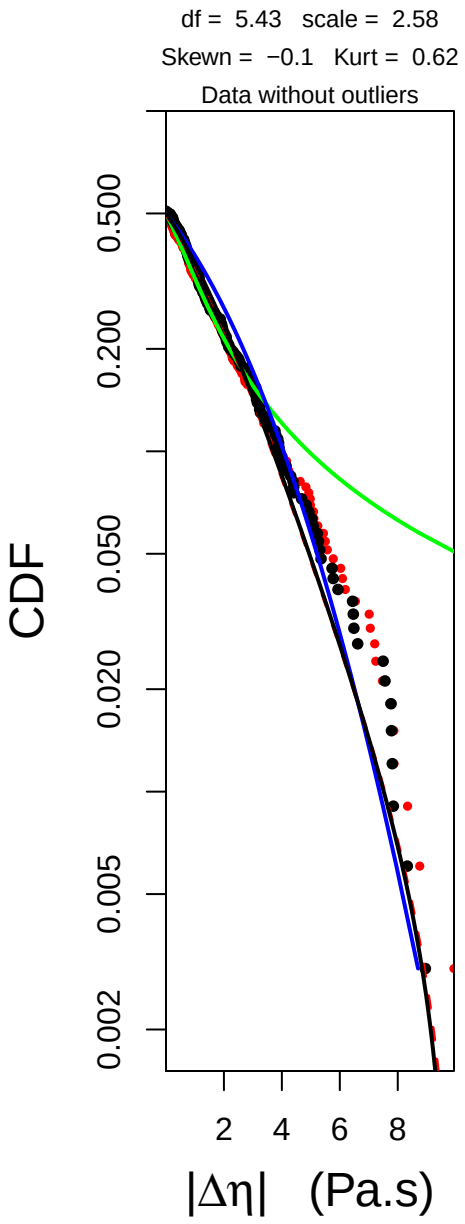

Volatility proxy
0.2
0.4
0.6
0.8
1.0
50
150
t

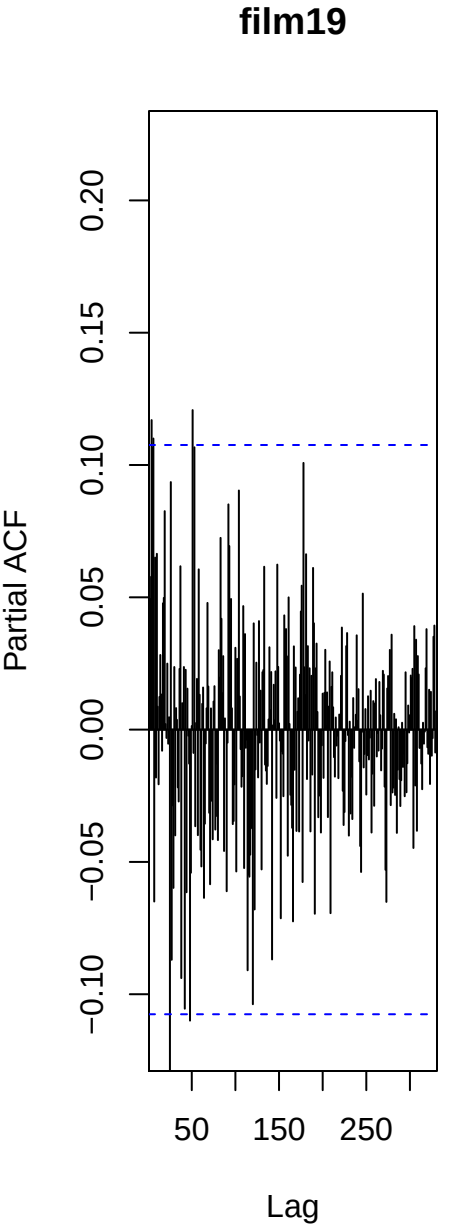

Volatility Clustering
cte = 0.093
Variogram
0.07
0.08
0.09
0.10
0.11
0
40
80
120
Lag l

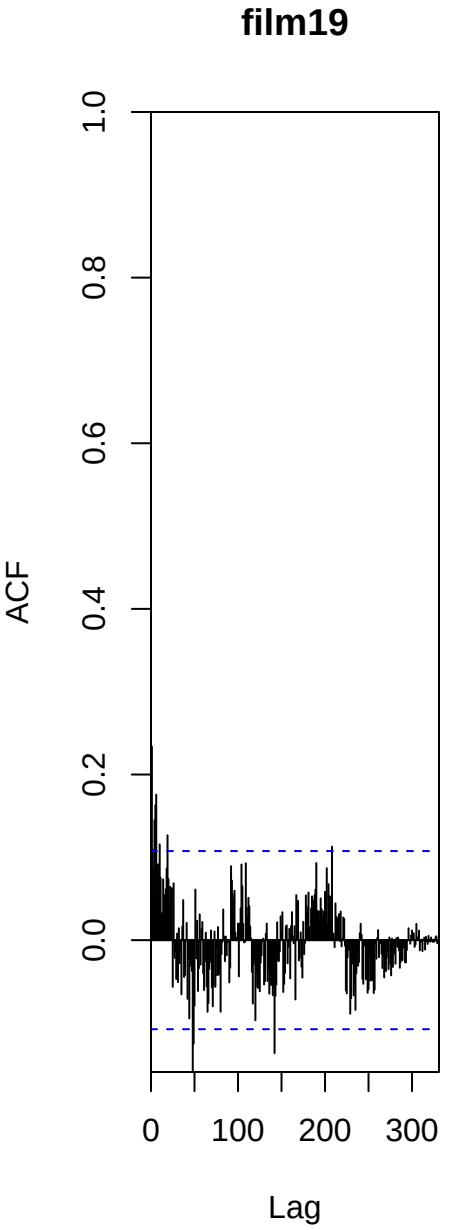

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
20
25
30
−0.02
0.00
0.02
residuals(variogramfit)

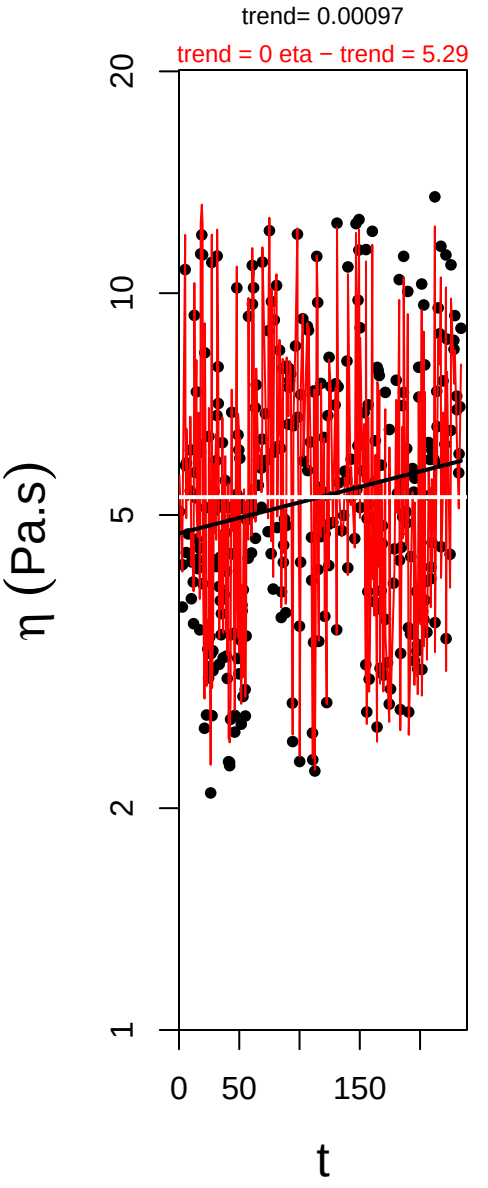

film19
original data # 362 new data # 332
η (Pa.s)
t
50
150
1
2
5
10
20
50

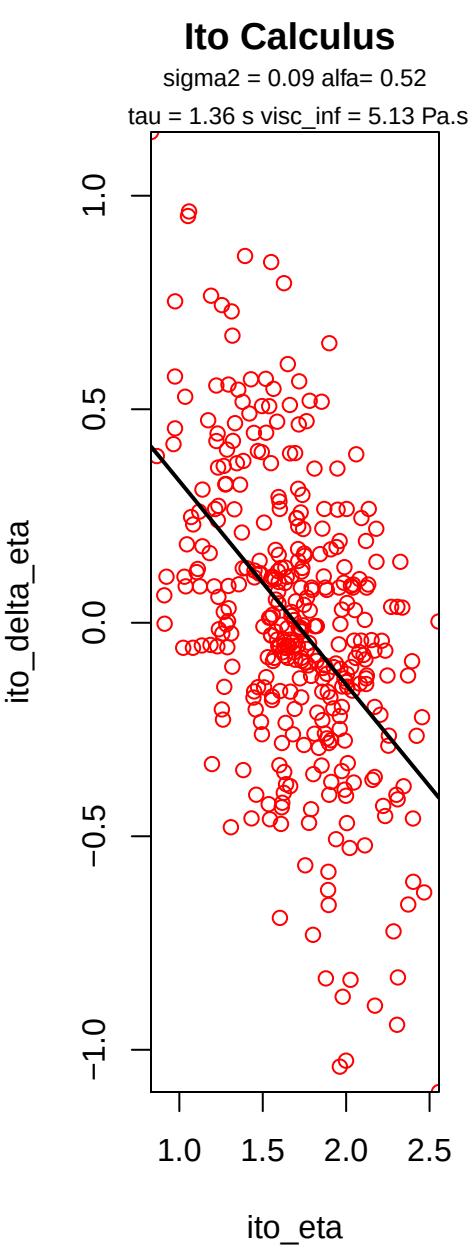

ecdf(eta)
Fn(x)
eta
0.0
0.2
0.4
0.6
0.8
1.0
4
6
8
12

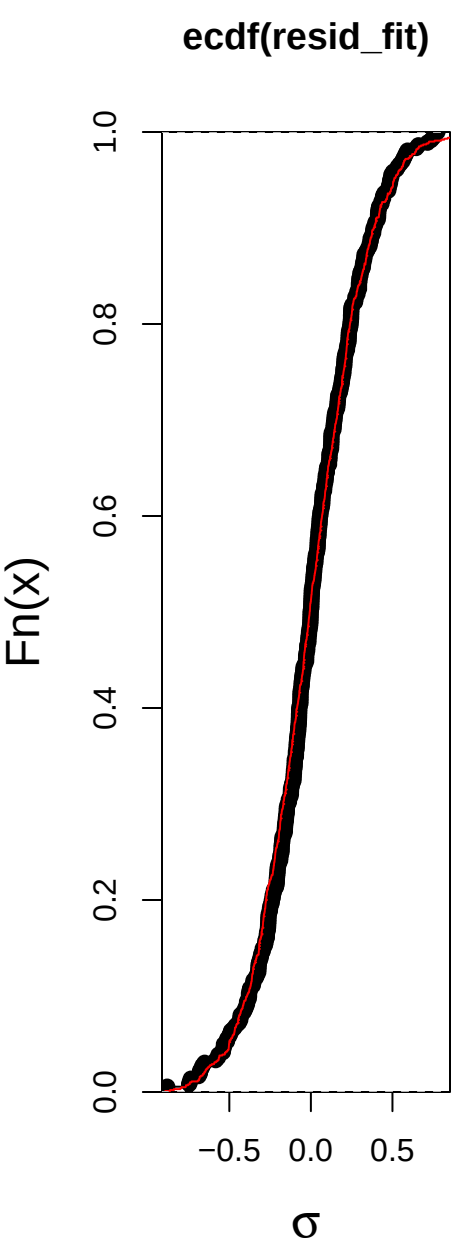

df = 5.43 scale = 2.58
Skewn = −0.1 Kurt = 0.62
Data without outliers
CDF
0.500
0.200
0.050
0.020
0.005
0.002
2
4
6
8
|Δη| (Pa.s)

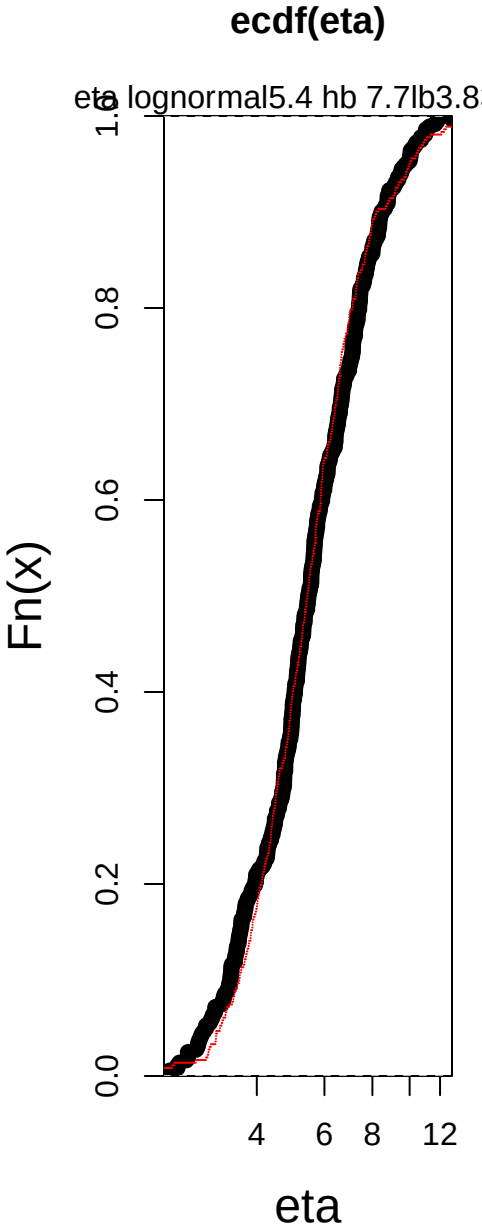

film19
Partial ACF
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
50
150
250
Lag

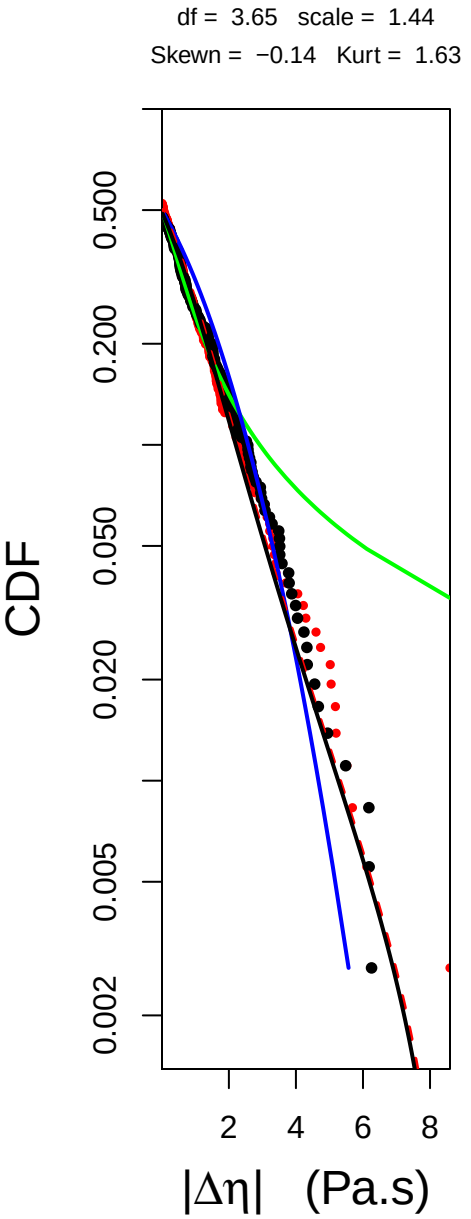

film19
ACF
1.0
0.8
0.6
0.4
0.2
0.0
0
100
200
300
Lag


trend= 0.00097
trend = 0 eta − trend = 5.29
η (Pa.s)
20
10
5
2
1
0
50
150
t

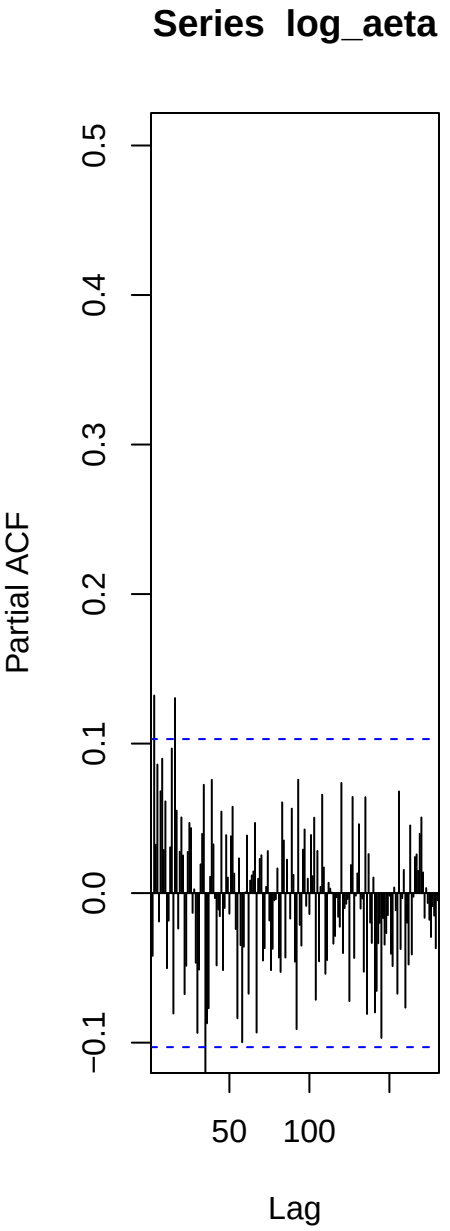

Ito Calculus
sigma2 = 0.09 alfa= 0.52
tau = 1.36 s visc_inf = 5.13 Pa.s
ito_delta_eta
ito_eta
1.0
0.5
0.0
−0.5
−1.0
1.0
1.5
2.0
2.5

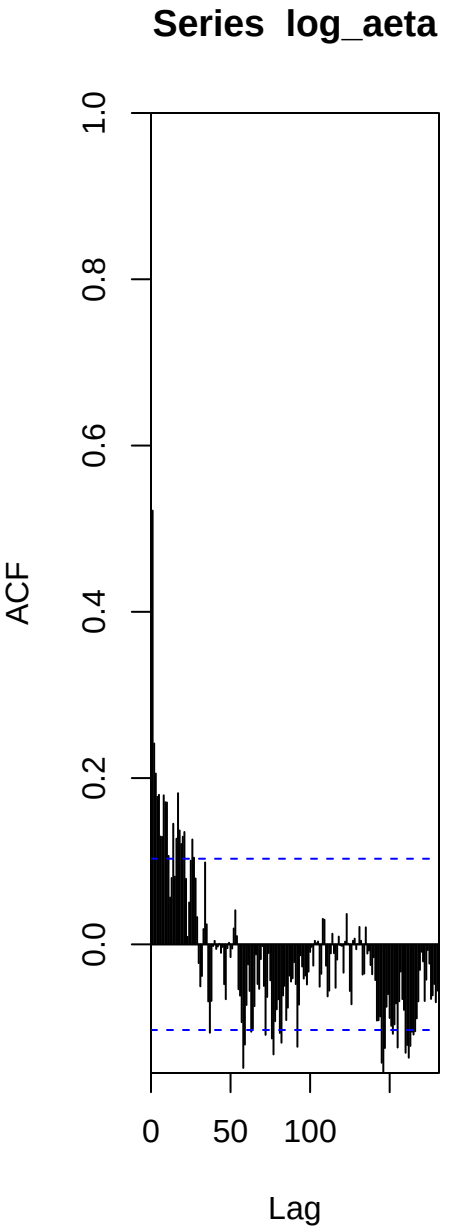

ecdf(resid_fit)
Fn(x)
σ
0.0
0.2
0.4
0.6
0.8
1.0
−0.5
0.0
0.5

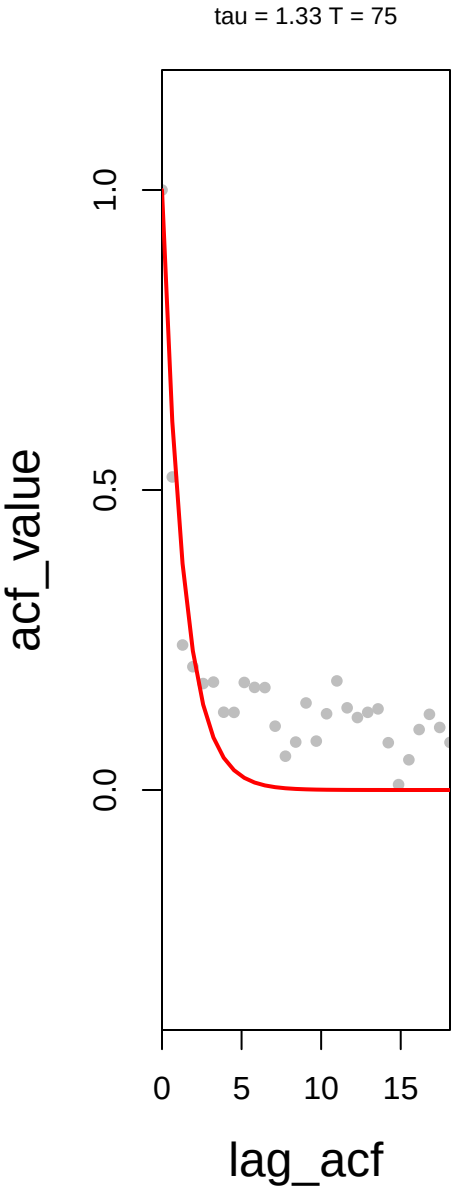


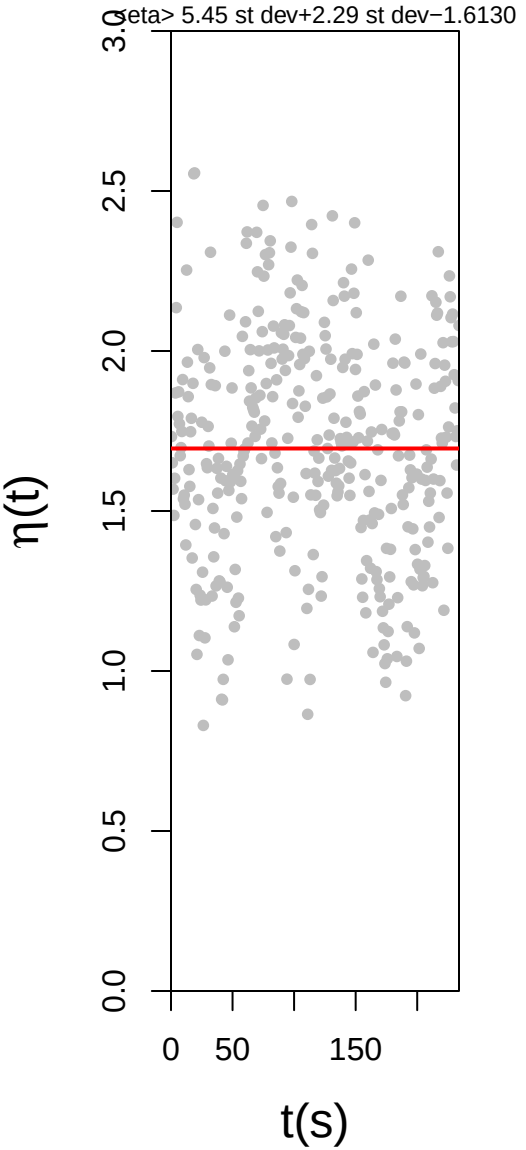


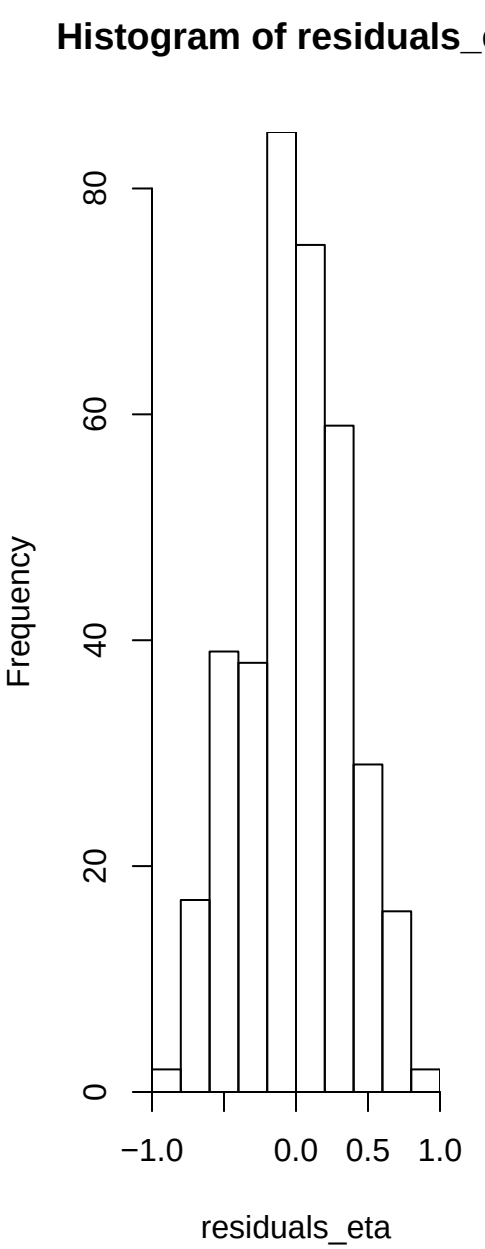
original data #

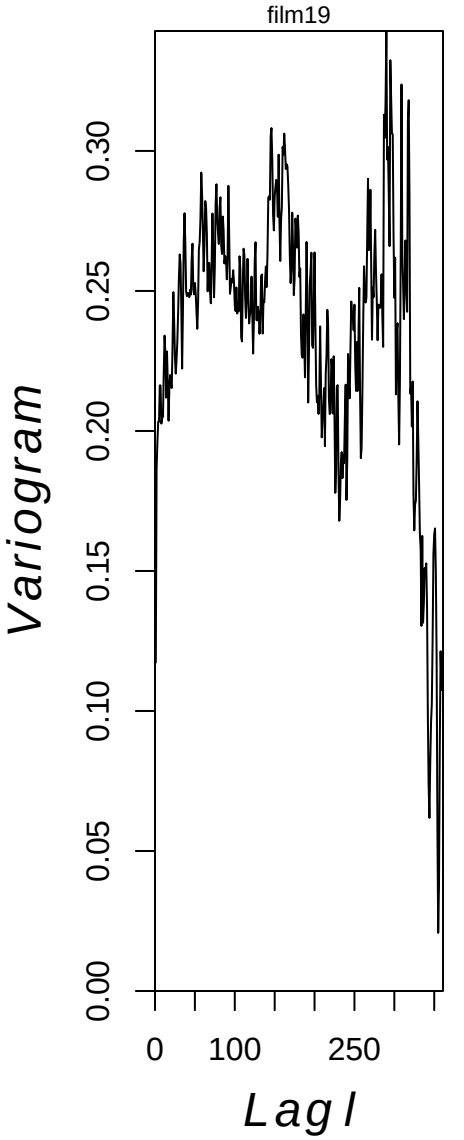

Series log_aeta
Partial ACF
0.5
0.4
0.3
0.2
0.1
0.0
−0.1
50
100
Lag

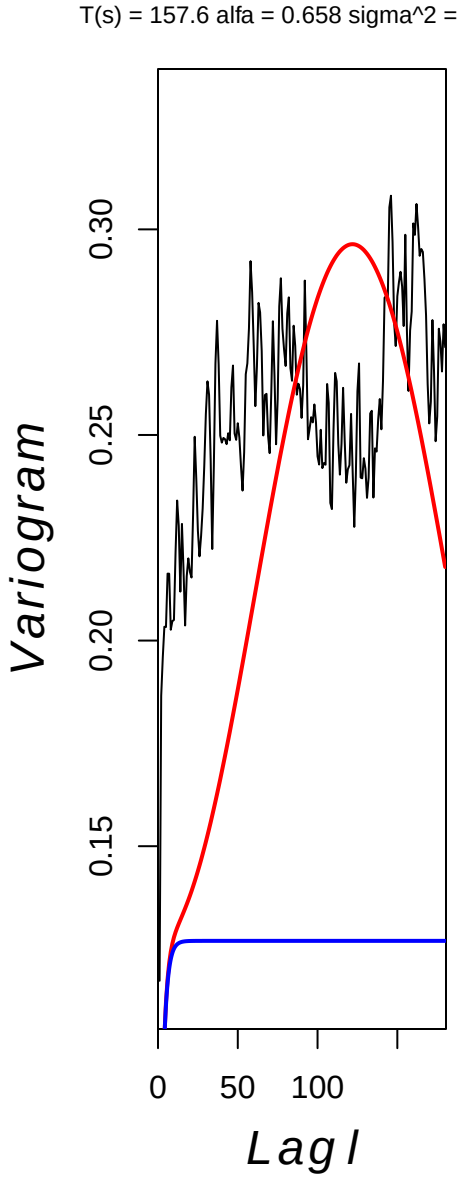

Series log_aeta
ACF
1.0
0.8
0.6
0.4
0.2
0.0
0
50
100
Lag

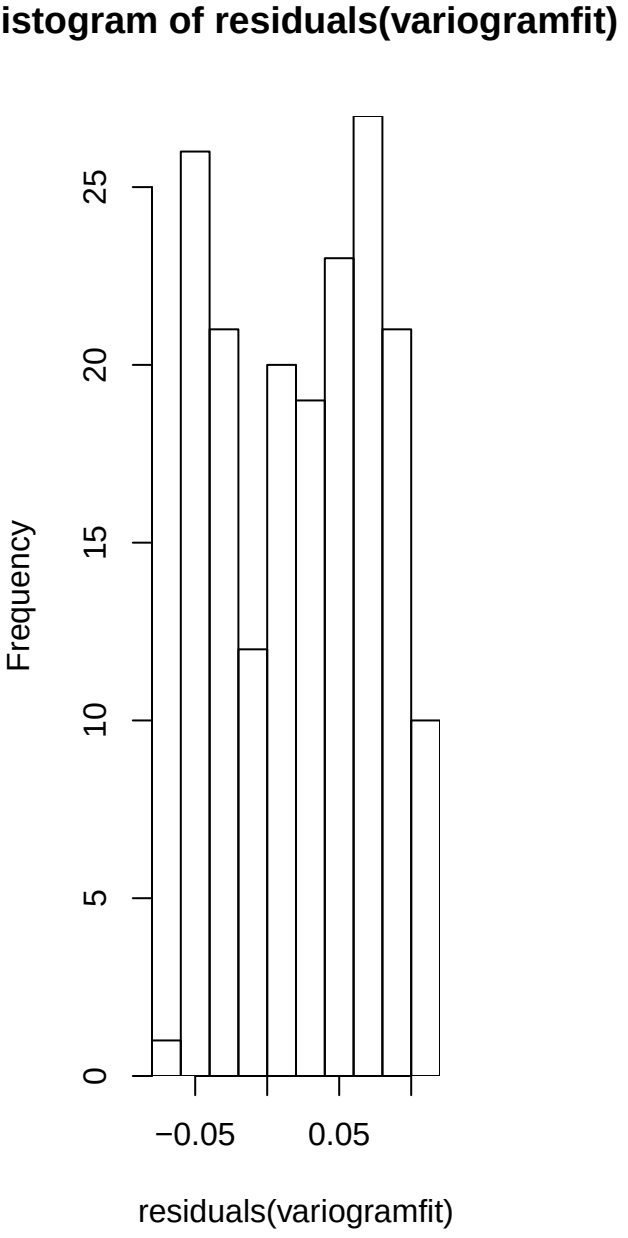

tau = 1.33 T = 75
acf_value
0.0
0.5
1.0
0
5
10
15
lag_acf

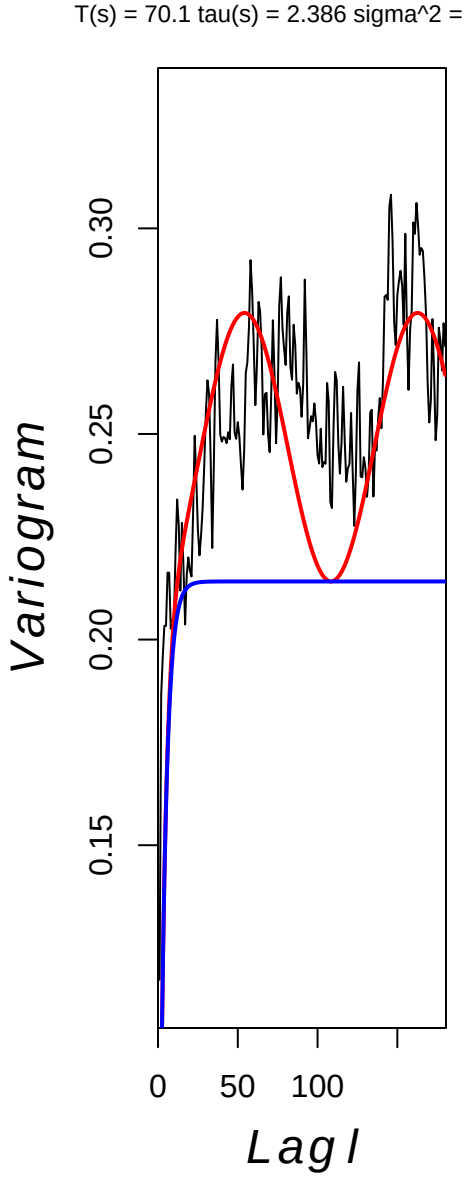

eta> 5.45 st dev+2.29 st dev−1.6130
η(t)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
50
150
t(s)

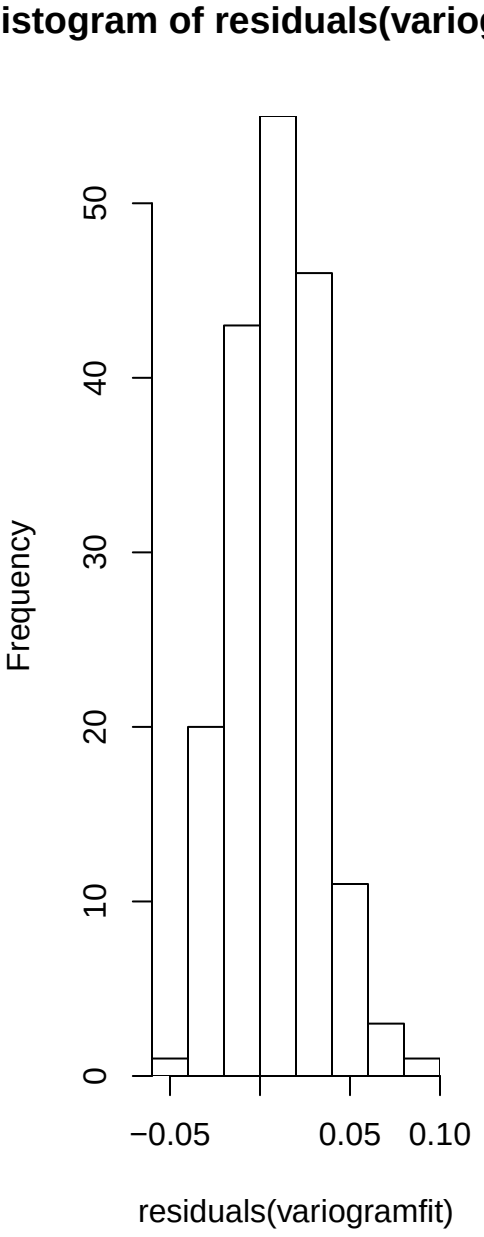

Histogram of residuals_eta
Frequency
0
20
40
60
80
−1.0
0.0
0.5
1.0
residuals_eta

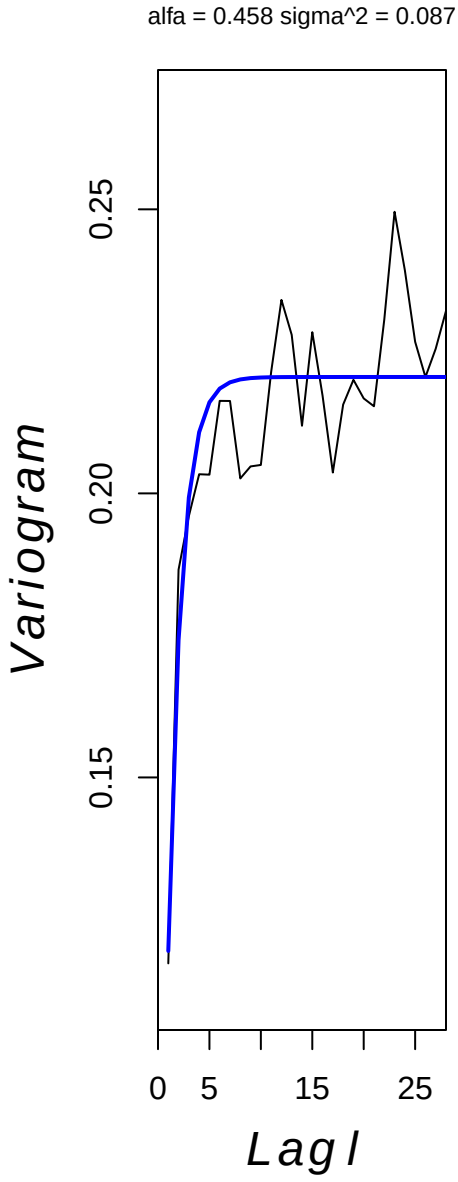

film19
Variogram
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0
100
250
Lag l

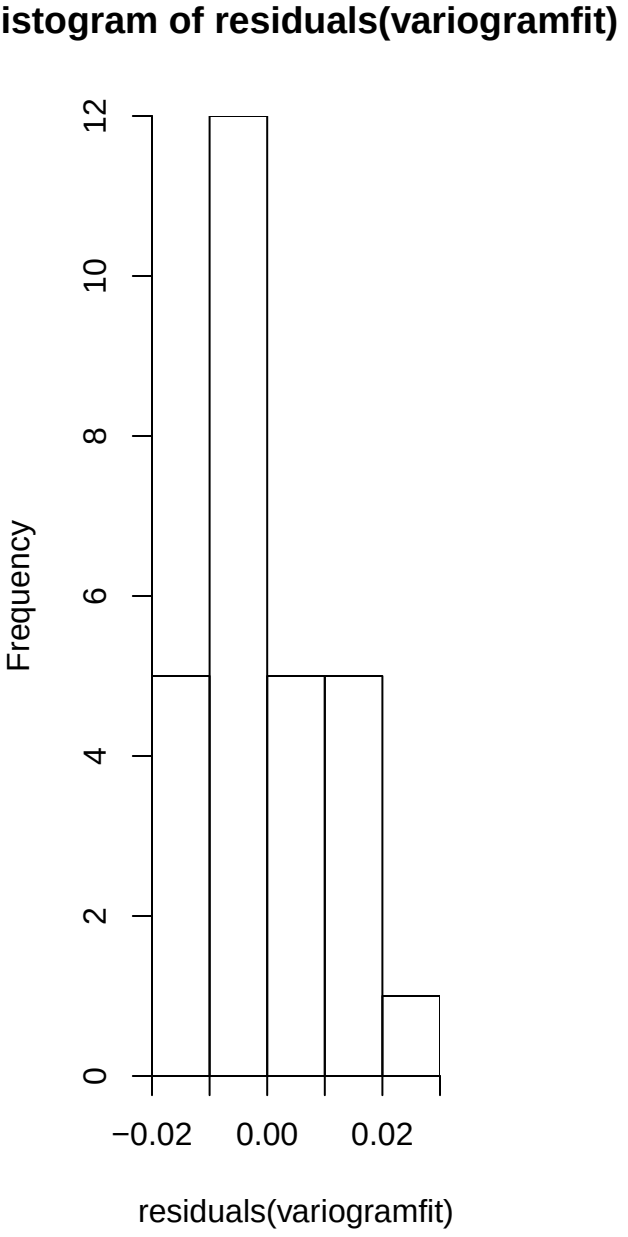

T(s) = 157.6 alfa = 0.658 sigma^2 = 0.036
Variogram
0.15
0.20
0.25
0.30
0
50
100
Lag l

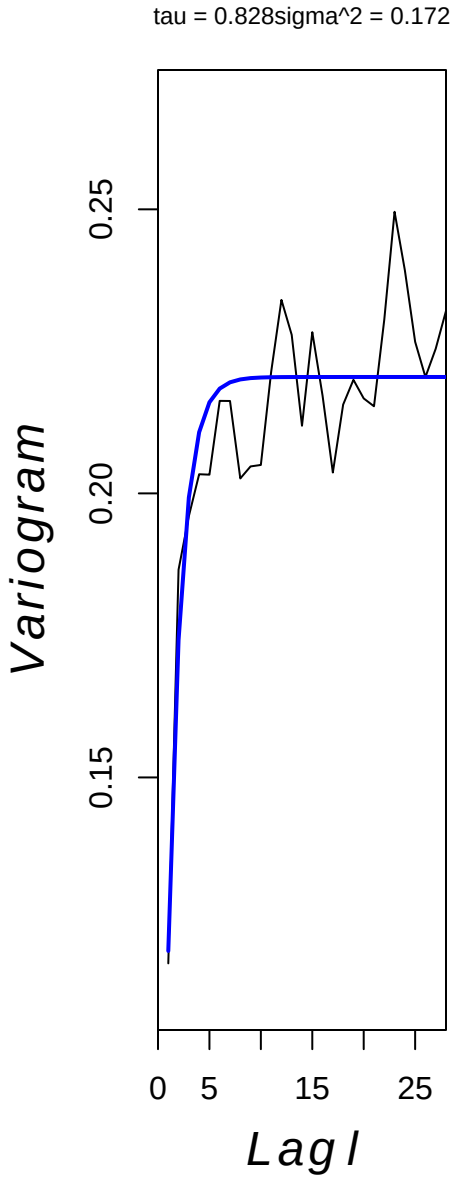

Histogram of residuals(variogramfit)
Frequency
0
5
10
15
20
25
−0.05
0.05
residuals(variogramfit)

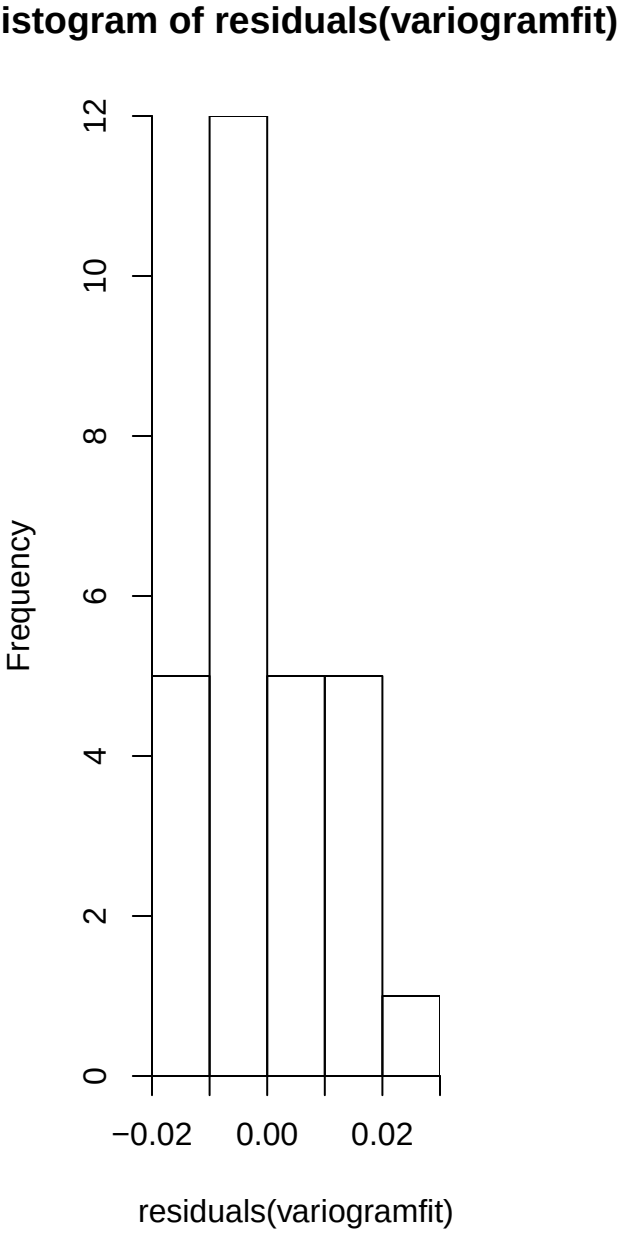

T(s) = 70.1 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.15
0.20
0.25
0.30
0
50
100
Lag l

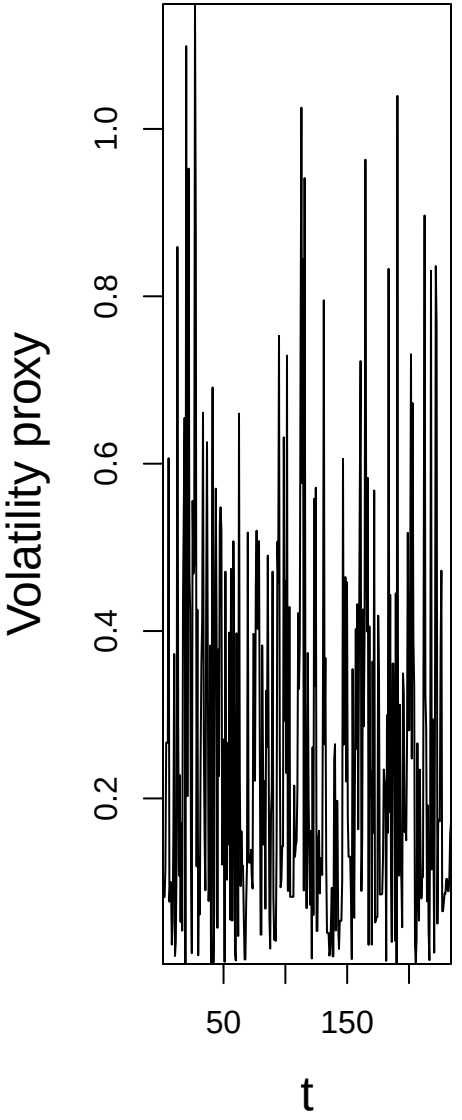

Histogram of residuals(variogramfit)
Frequency
0
10
20
30
40
50
−0.05
0.05
0.10
residuals(variogramfit)

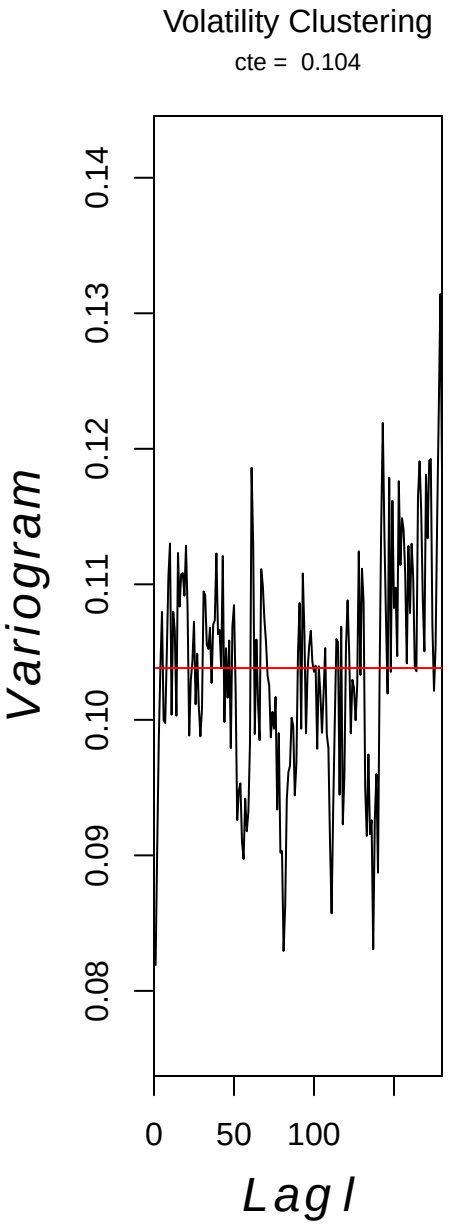

alfa = 0.458 sigma^2 = 0.087
Variogram
0.15
0.20
0.25
0
5
15
25
Lag l

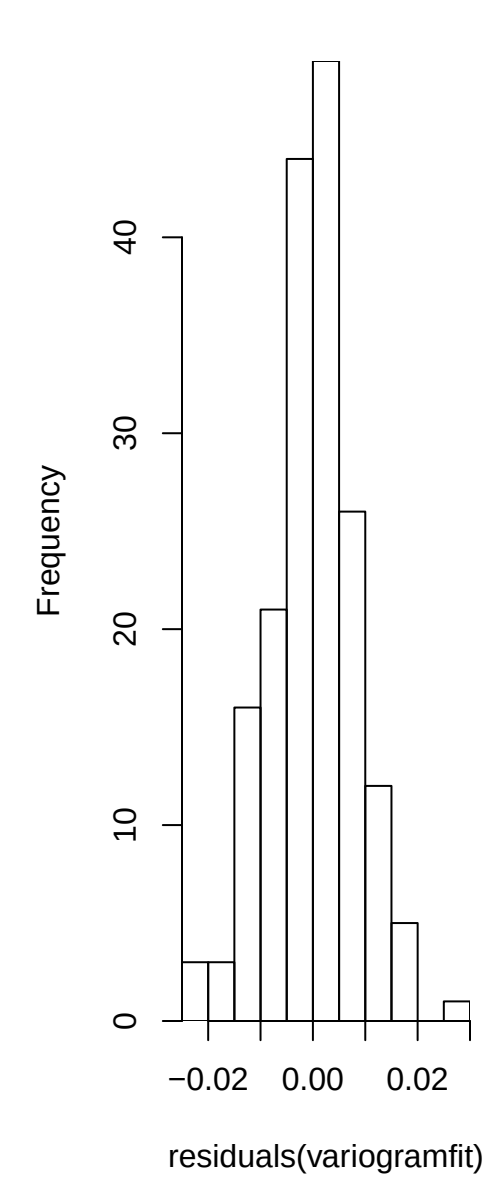

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
12
−0.02
0.00
0.02
residuals(variogramfit)

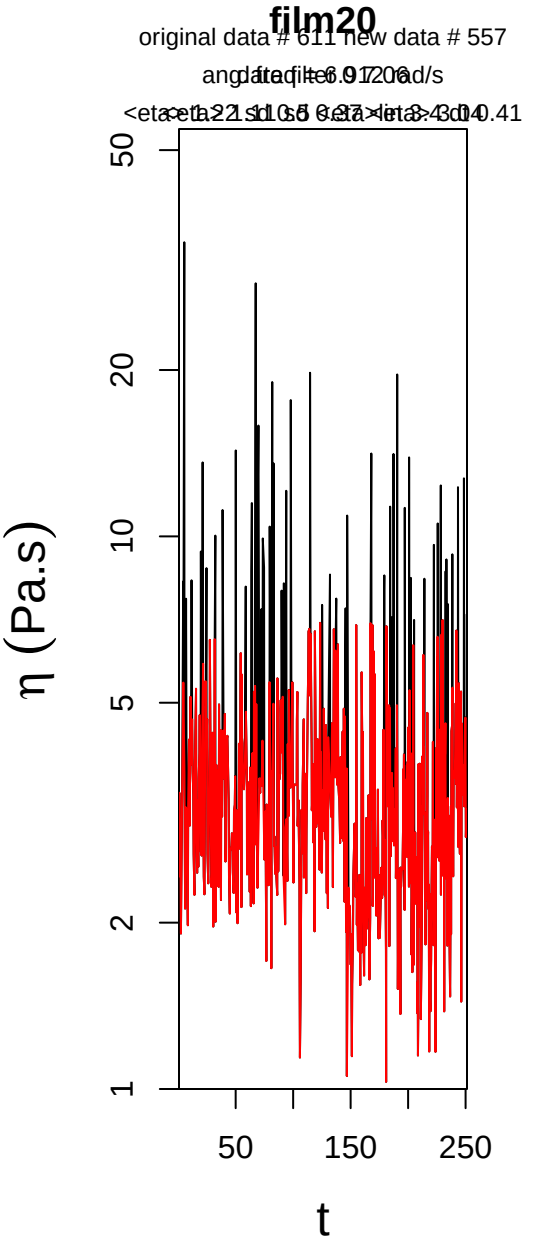

tau = 0.828sigma^2 = 0.172
Variogram
0.15
0.20
0.25
0
5
15
25
Lag l

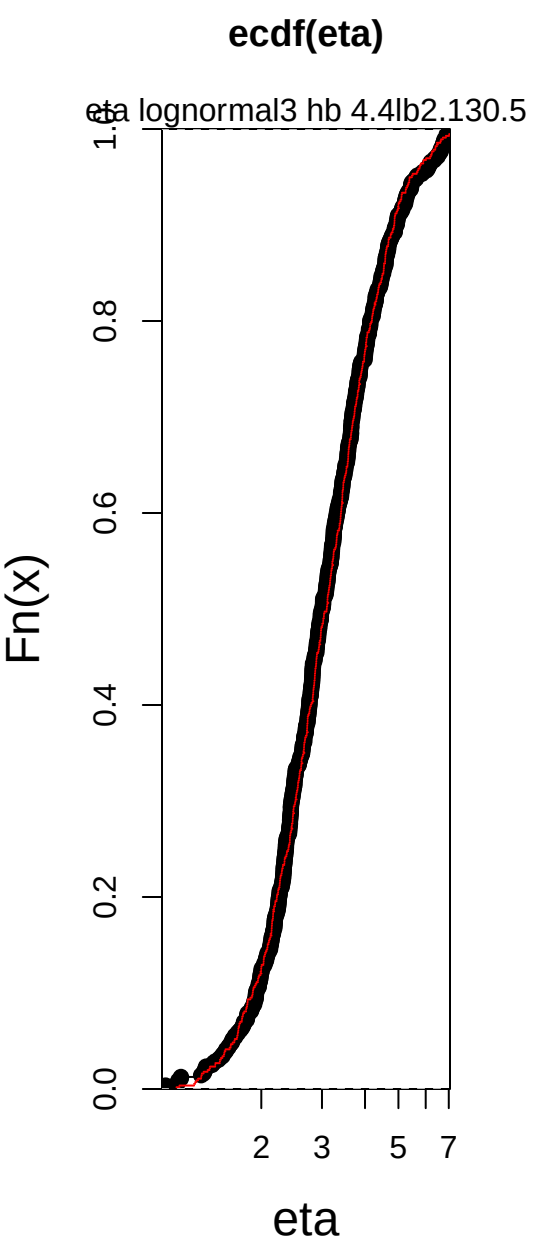

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
12
−0.02
0.00
0.02
residuals(variogramfit)

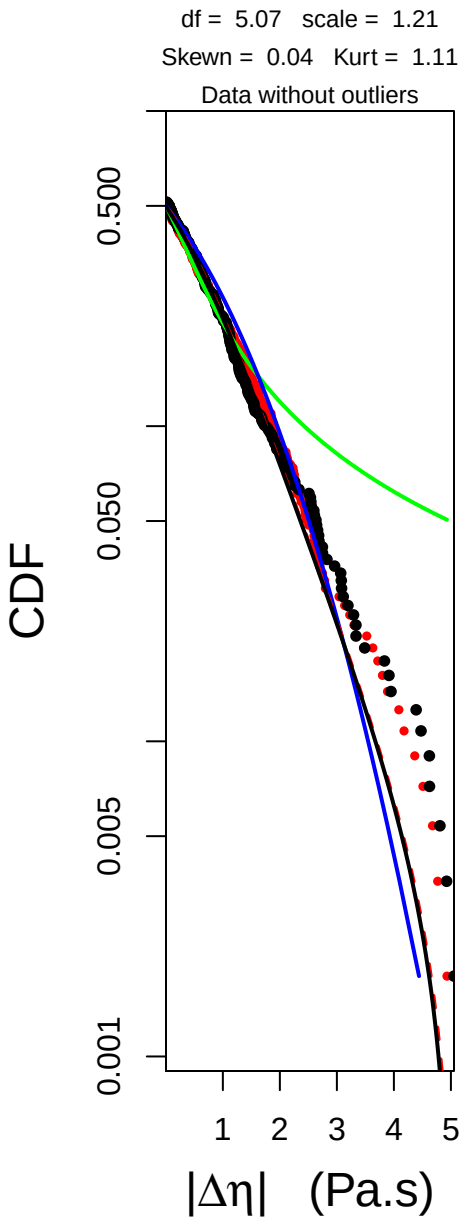

Volatility proxy
0.2
0.4
0.6
0.8
1.0
50
150
t

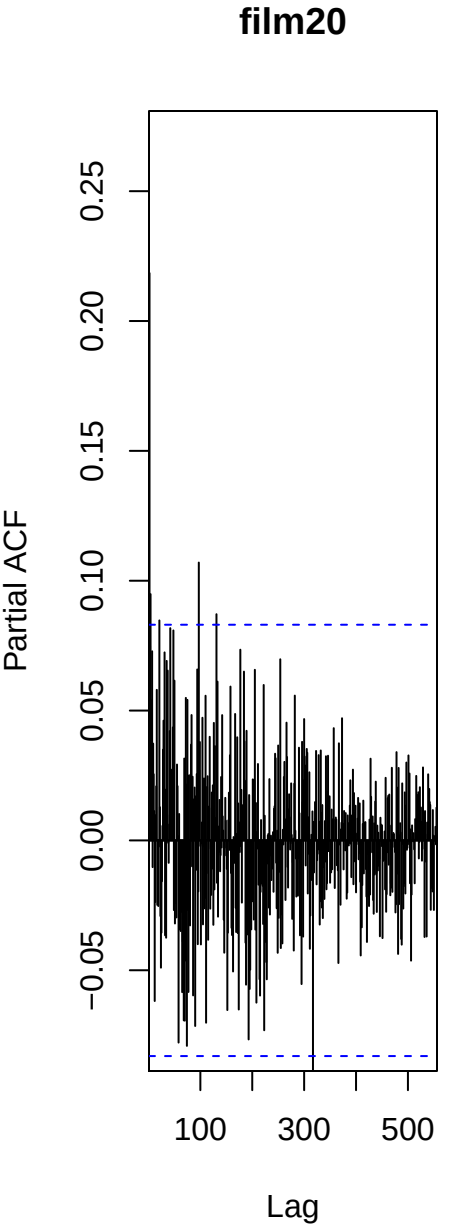

Volatility Clustering
cte = 0.104
Variogram
0.08
0.09
0.10
0.11
0.12
0.13
0.14
0
50
100
Lag l

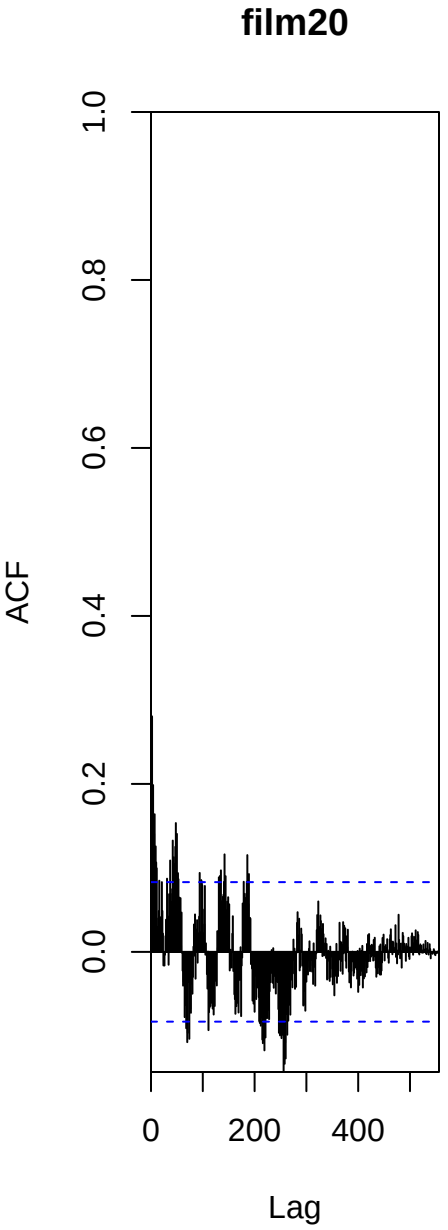

Histogram of residuals(variogramfit)
Frequency
0
10
20
30
40
−0.02
0.00
0.02
residuals(variogramfit)

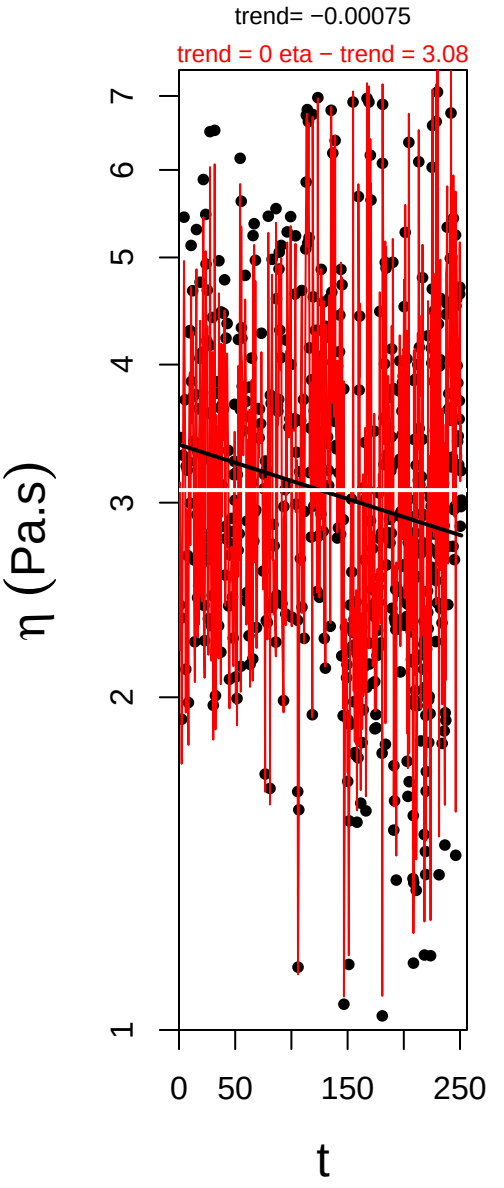

film20
original data # 611 new data # 557
η (Pa.s)
t

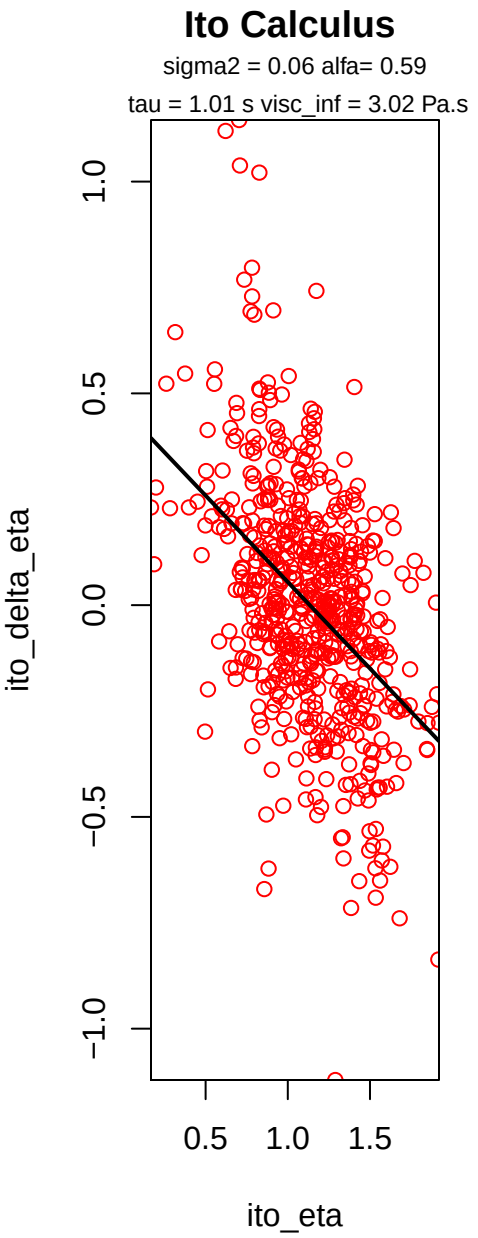

ecdf(eta)
eta lognormal3 hb 4.4lb2.130.5
Fn(x)
eta

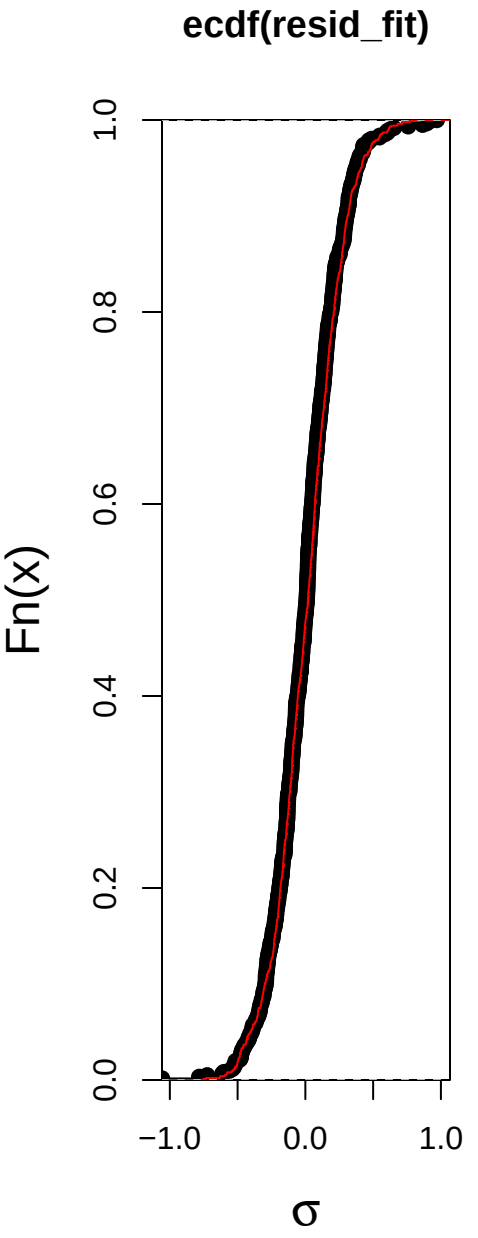

df = 5.07 scale = 1.21
Skewn = 0.04 Kurt = 1.11
Data without outliers
CDF
0.500
0.050
0.005
0.001
1
2
3
4
5
|Δη| (Pa.s)

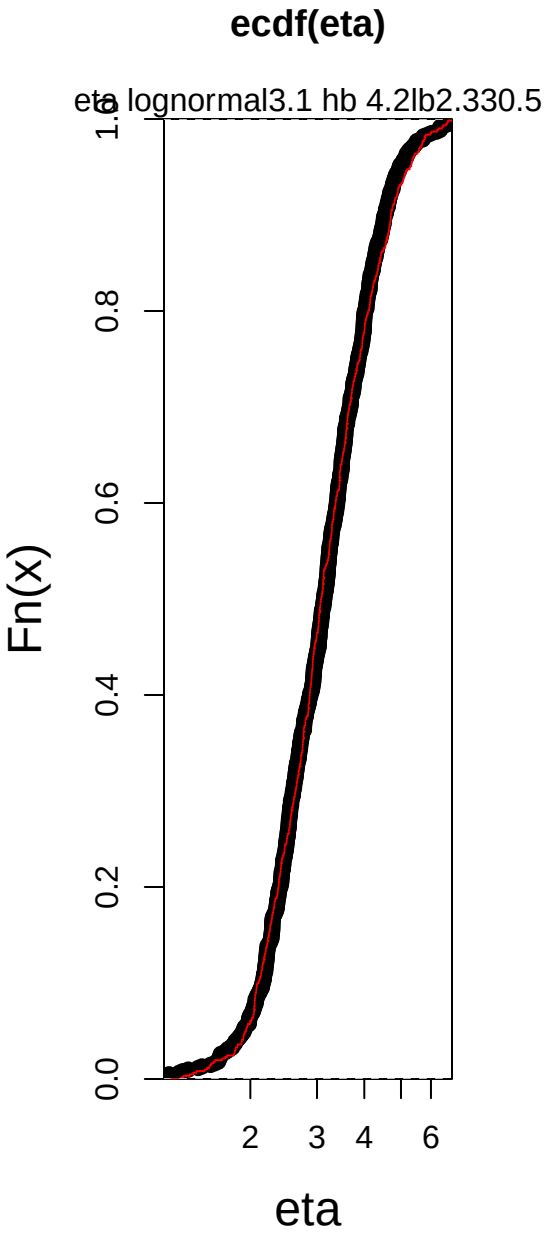

film20
Partial ACF
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
100
300
500
Lag

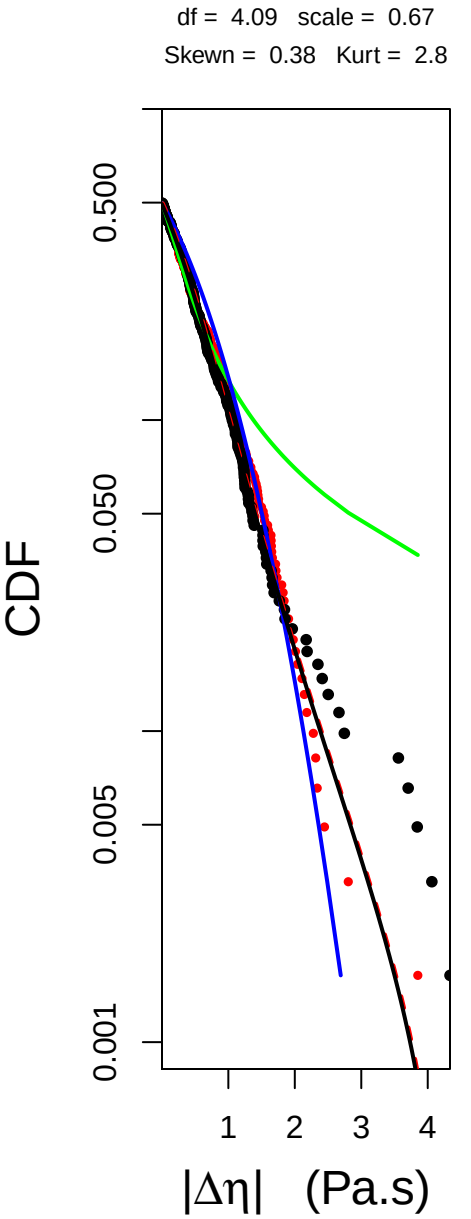

film20
ACF
1.0
0.8
0.6
0.4
0.2
0.0
0
200
400
Lag


trend= −0.00075
trend = 0 eta − trend = 3.08
η (Pa.s)
7
6
5
4
3
2
1
0
50
150
250
t

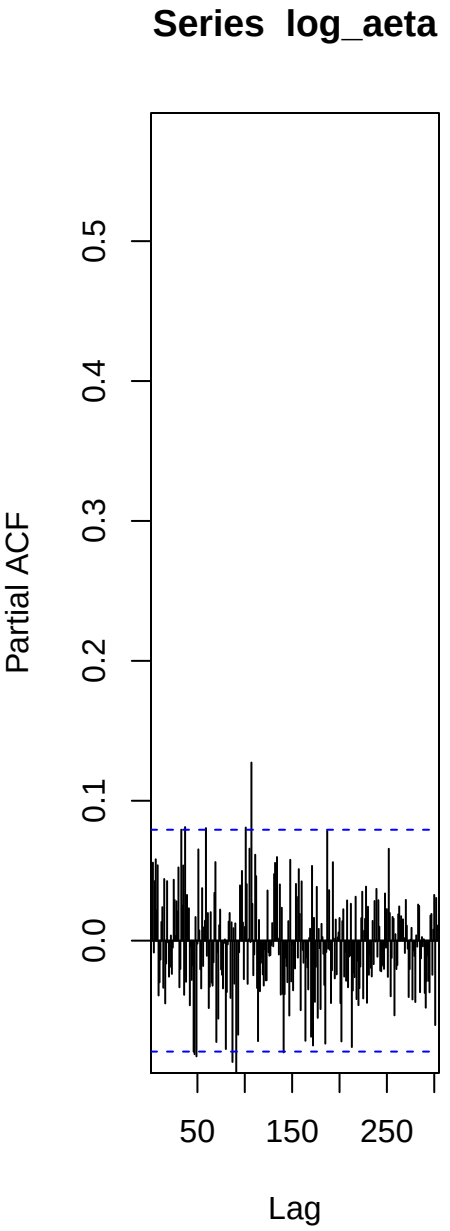

Ito Calculus
sigma2 = 0.06 alfa= 0.59
tau = 1.01 s visc_inf = 3.02 Pa.s
ito_delta_eta
ito_eta
1.0
0.5
0.0
−0.5
−1.0
0.5
1.0
1.5

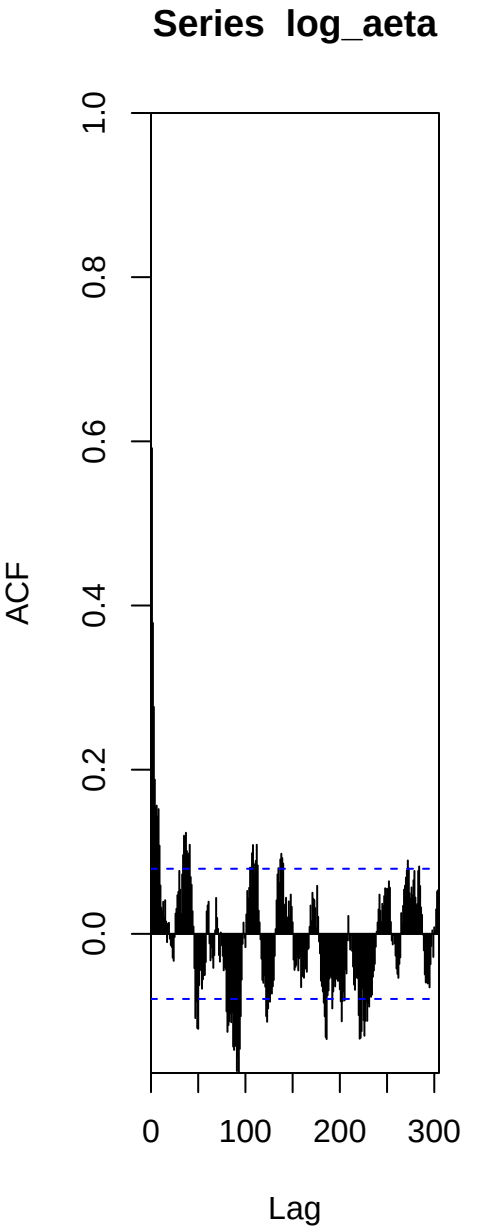

ecdf(resid_fit)
Fn(x)
σ
0.0
0.2
0.4
0.6
0.8
1.0
−1.0
0.0
1.0

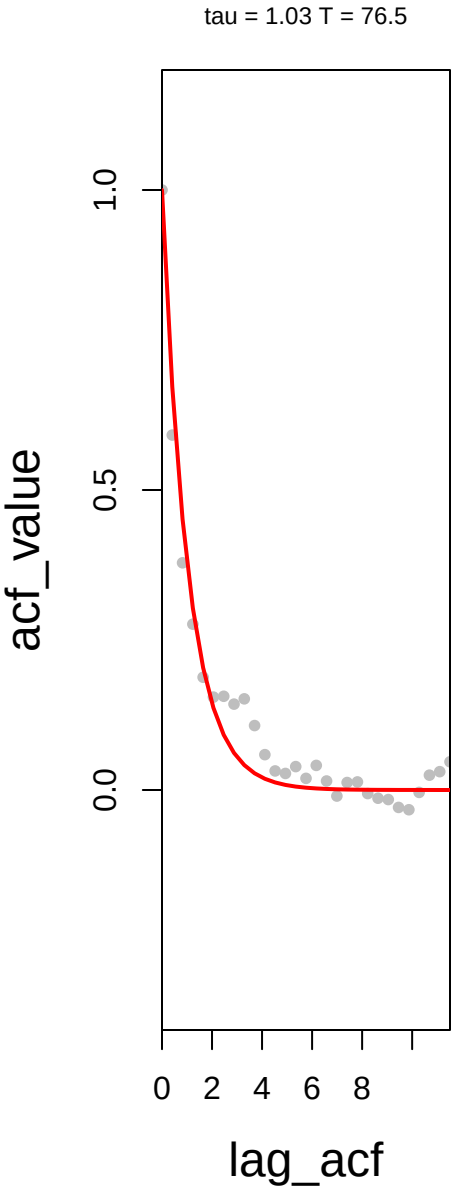


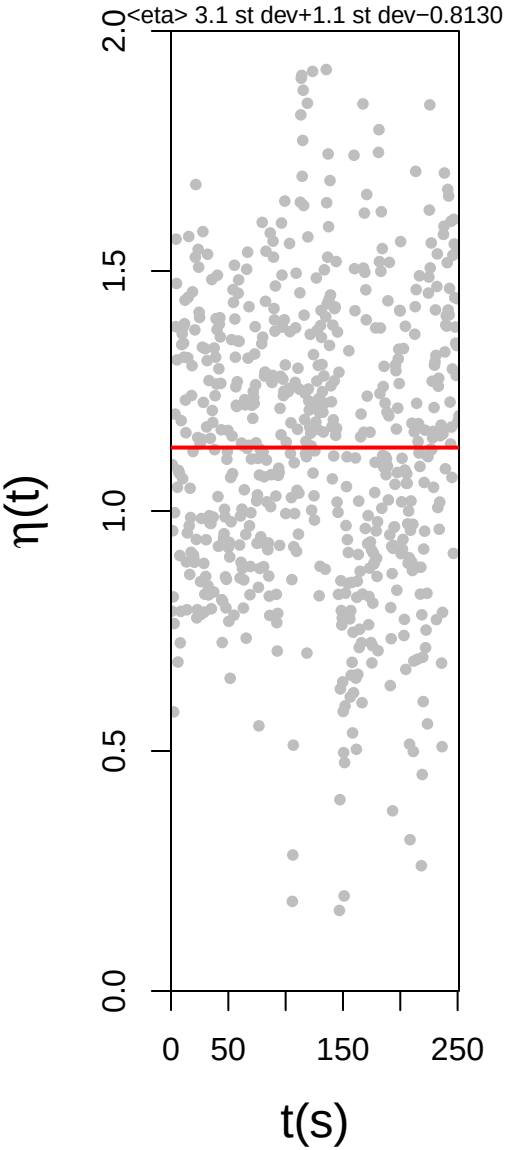


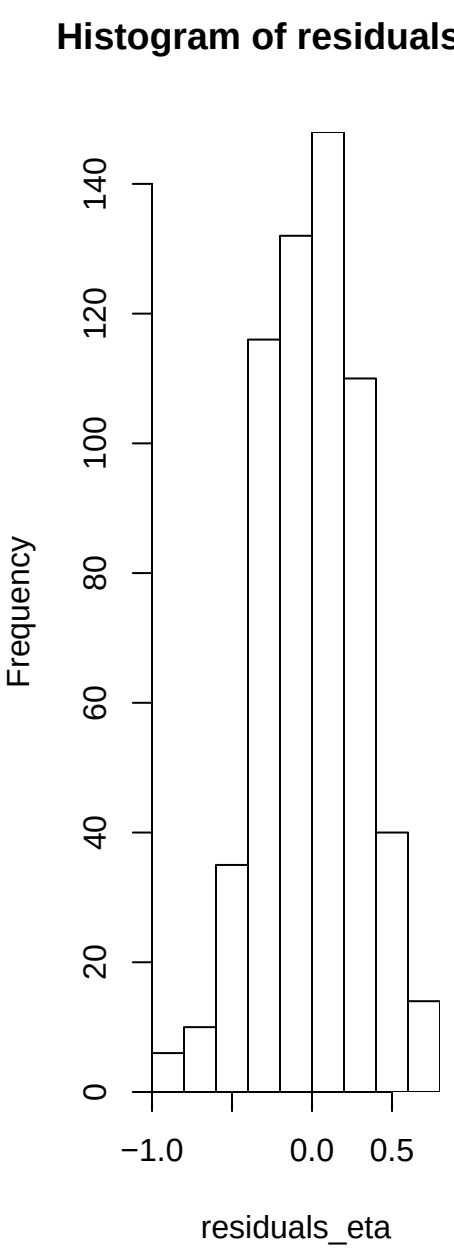
riginal data #

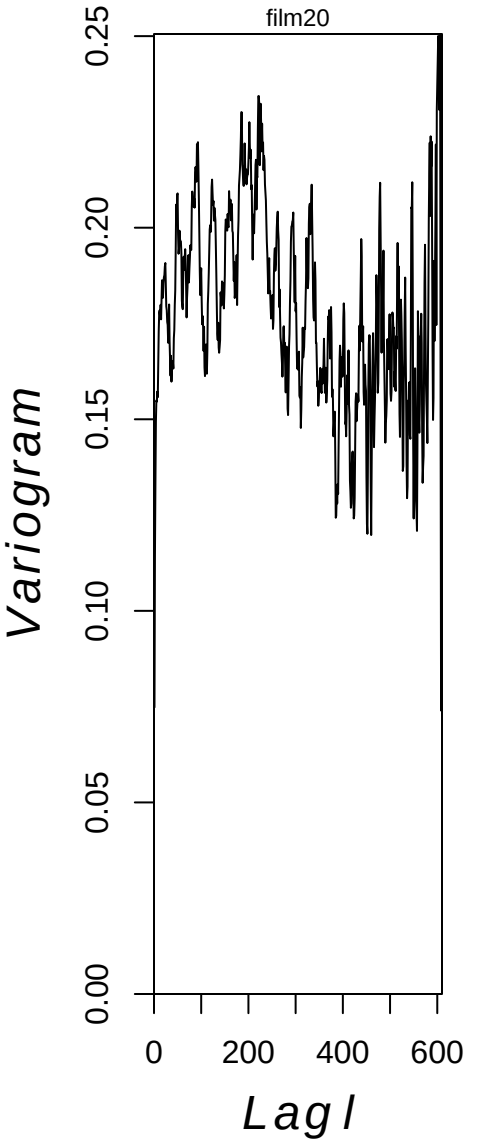

Series log_aeta
Partial ACF
0.0
0.1
0.2
0.3
0.4
0.5
50
150
250
Lag

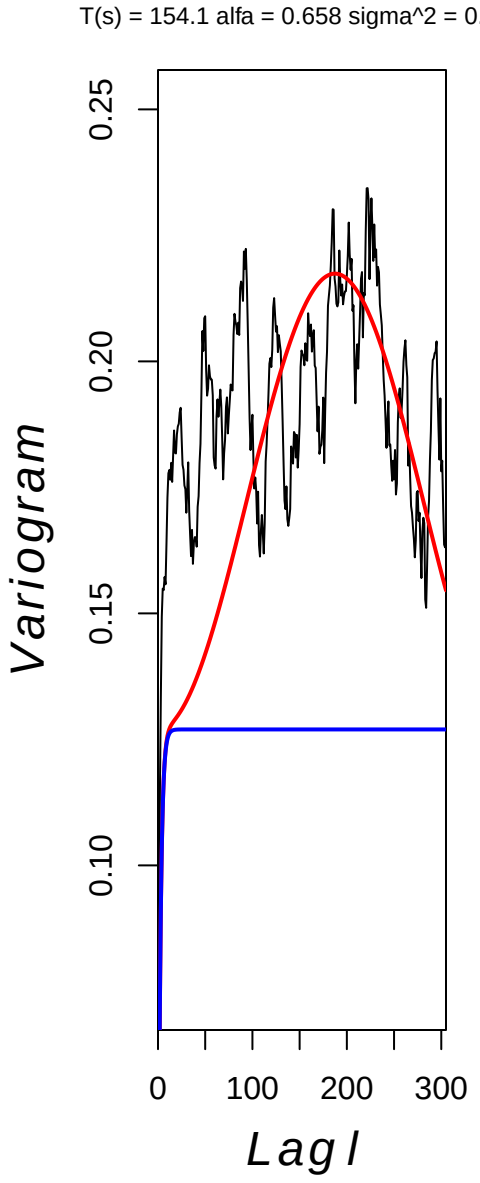

Series log_aeta
ACF
0.0
0.2
0.4
0.6
0.8
1.0
0
100
200
300
Lag

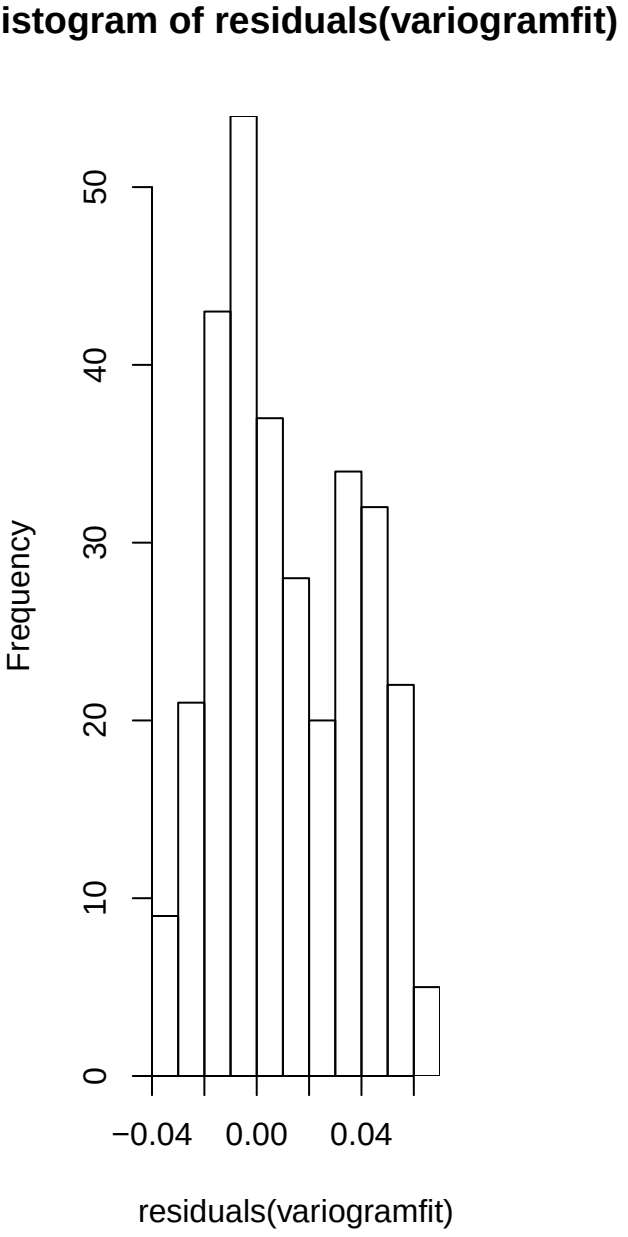

tau = 1.03 T = 76.5
acf_value
0.0
0.5
1.0
0
2
4
6
8
lag_acf

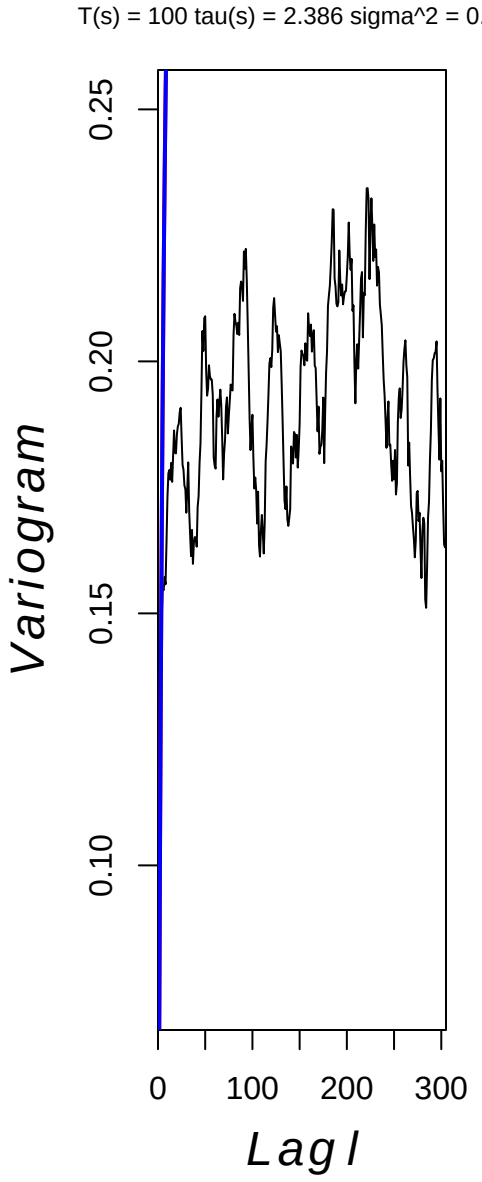

<eta> 3.1 st dev+1.1 st dev−0.8130
η(t)
0.0
0.5
1.0
1.5
2.0
0
50
150
250
t(s)

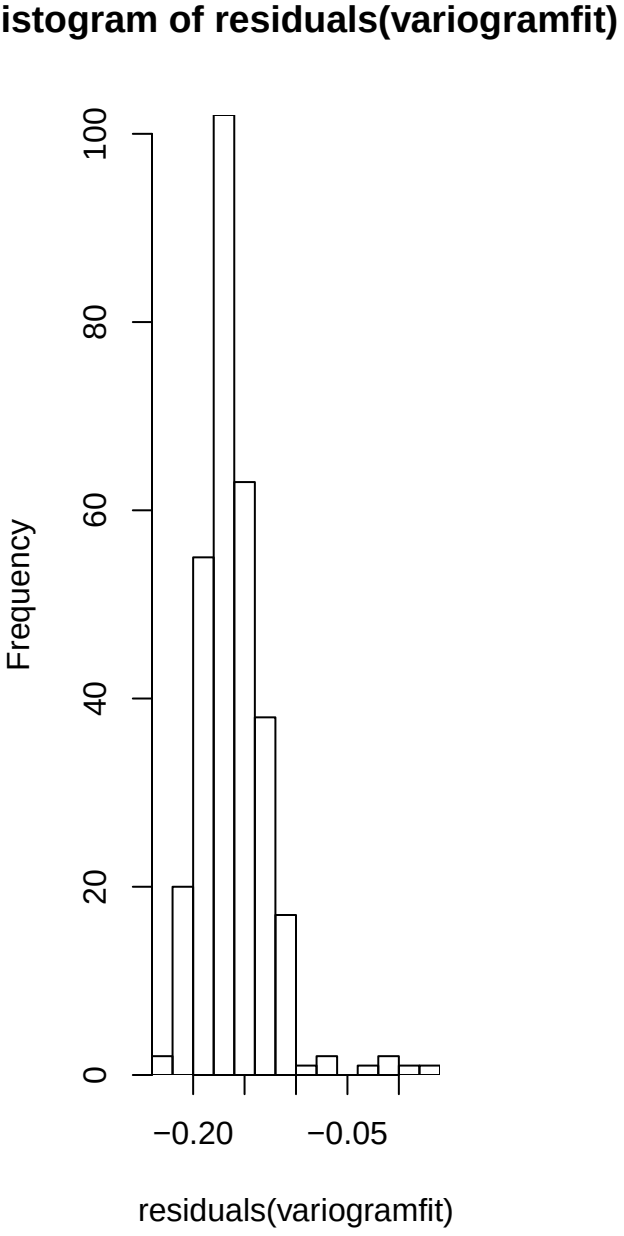

Histogram of residuals_eta
Frequency
0
20
40
60
80
100
120
140
−1.0
0.0
0.5
residuals_eta

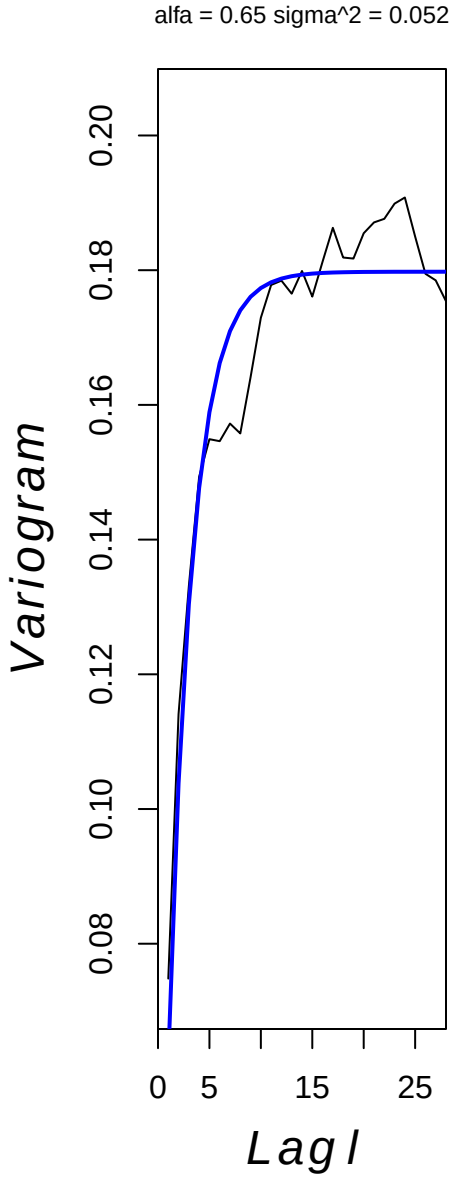

film20
Variogram
0.00
0.05
0.10
0.15
0.20
0.25
0
200
400
600
Lag l

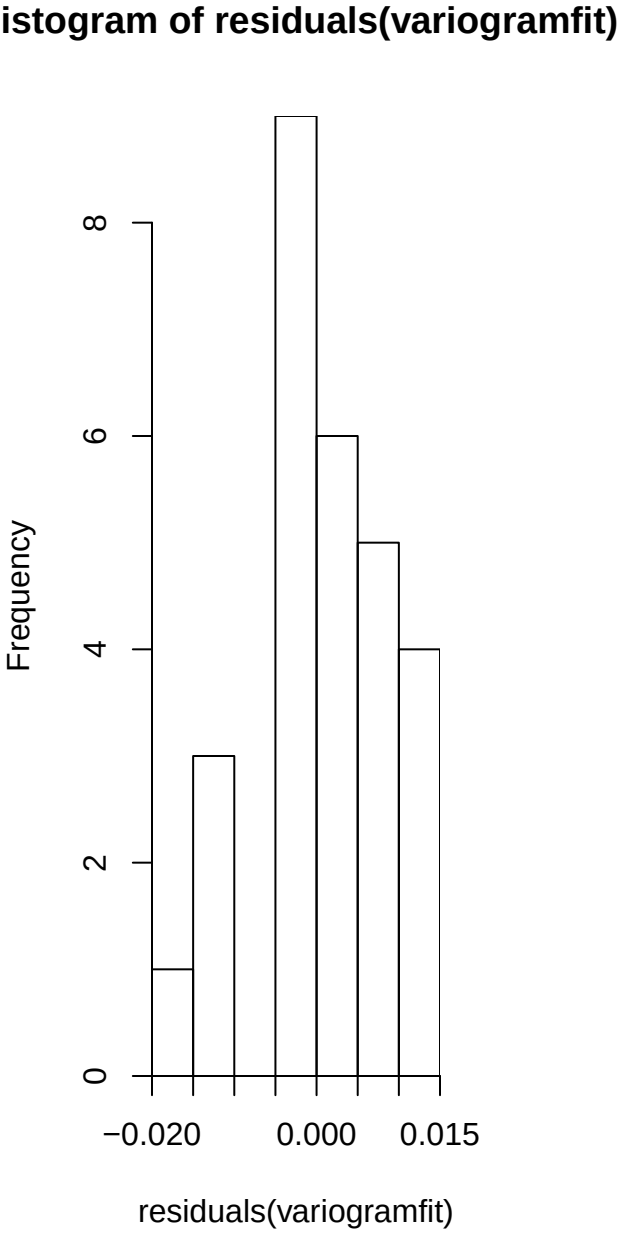

T(s) = 154.1 alfa = 0.658 sigma^2 = 0.036
Variogram
0.10
0.15
0.20
0.25
0
100
200
300
Lag l

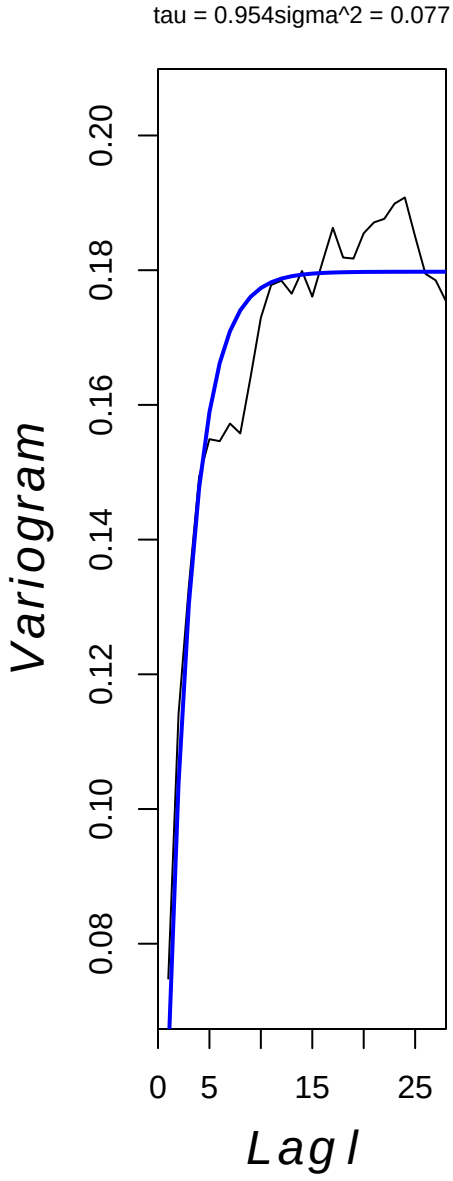

Histogram of residuals(variogramfit)
Frequency
0
10
20
30
40
50
−0.04
0.00
0.04
residuals(variogramfit)

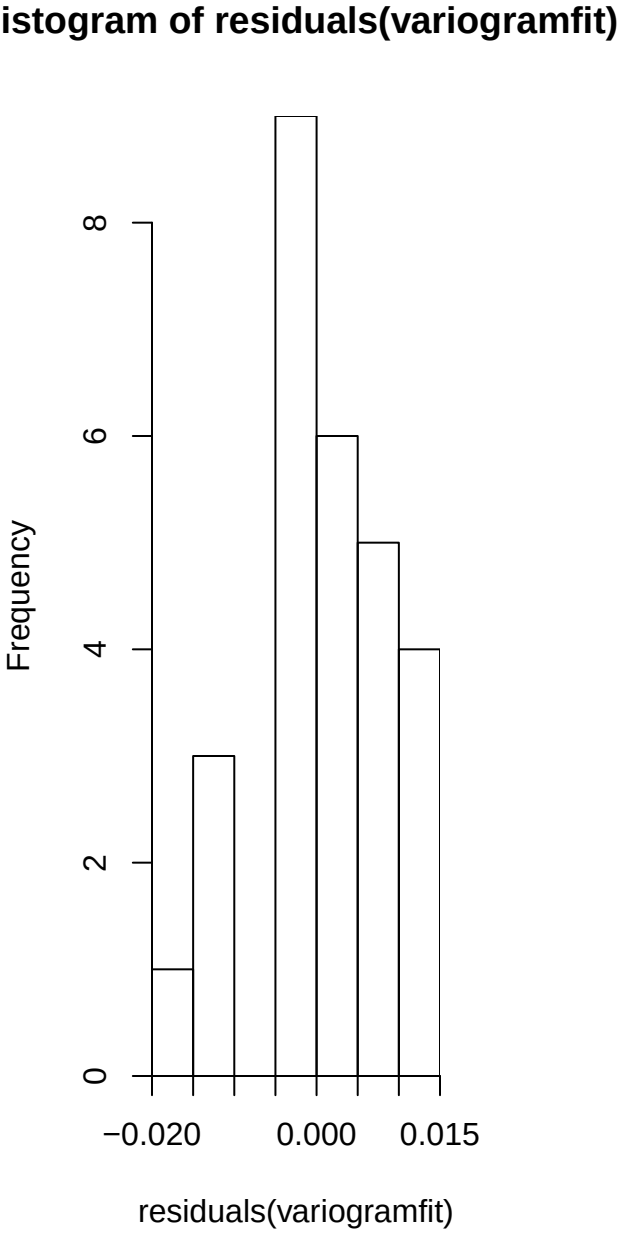

T(s) = 100 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.10
0.15
0.20
0.25
0
100
200
300
Lag l

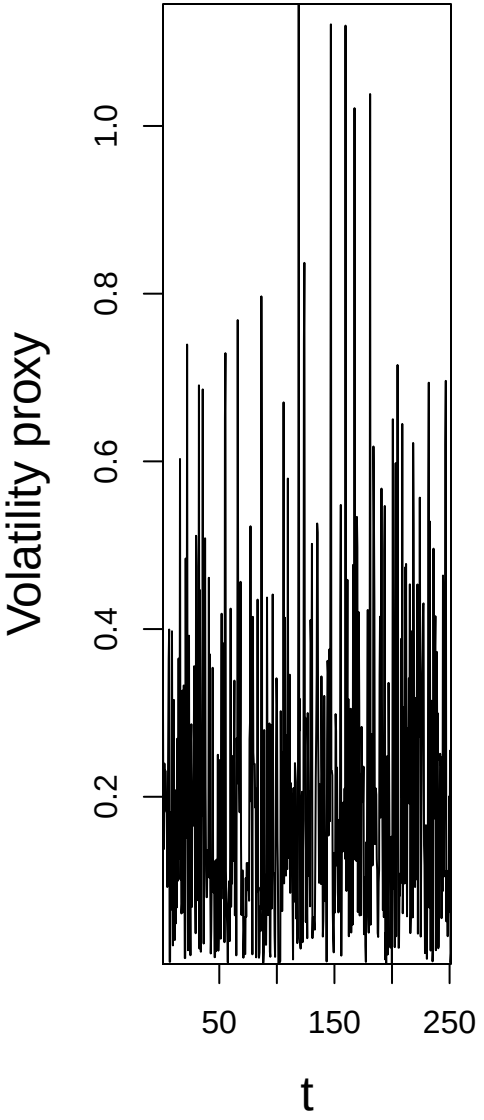

Histogram of residuals(variogramfit)
Frequency
0
20
40
60
80
100
−0.20
−0.05
residuals(variogramfit)

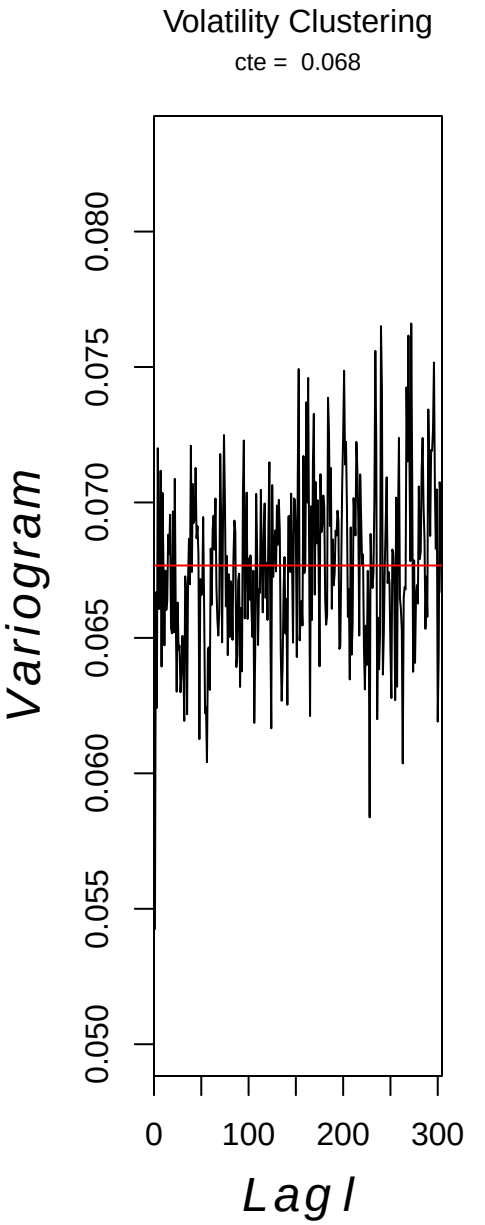

alfa = 0.65 sigma^2 = 0.052
Variogram
0.08
0.10
0.12
0.14
0.16
0.18
0.20
0
5
15
25
Lag l

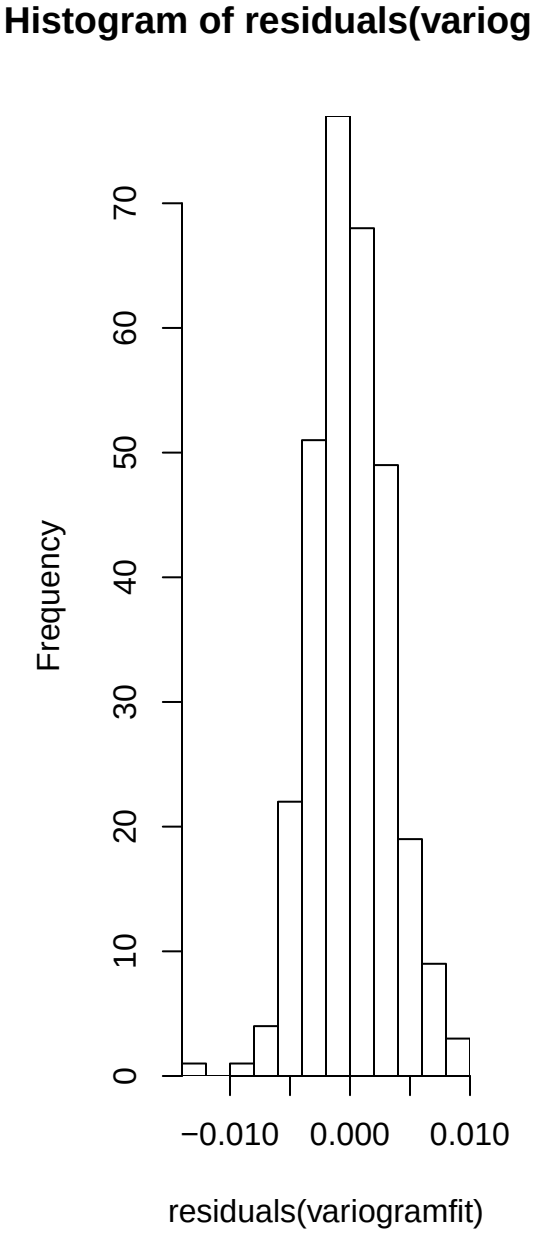

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
−0.020
0.000
0.015
residuals(variogramfit)

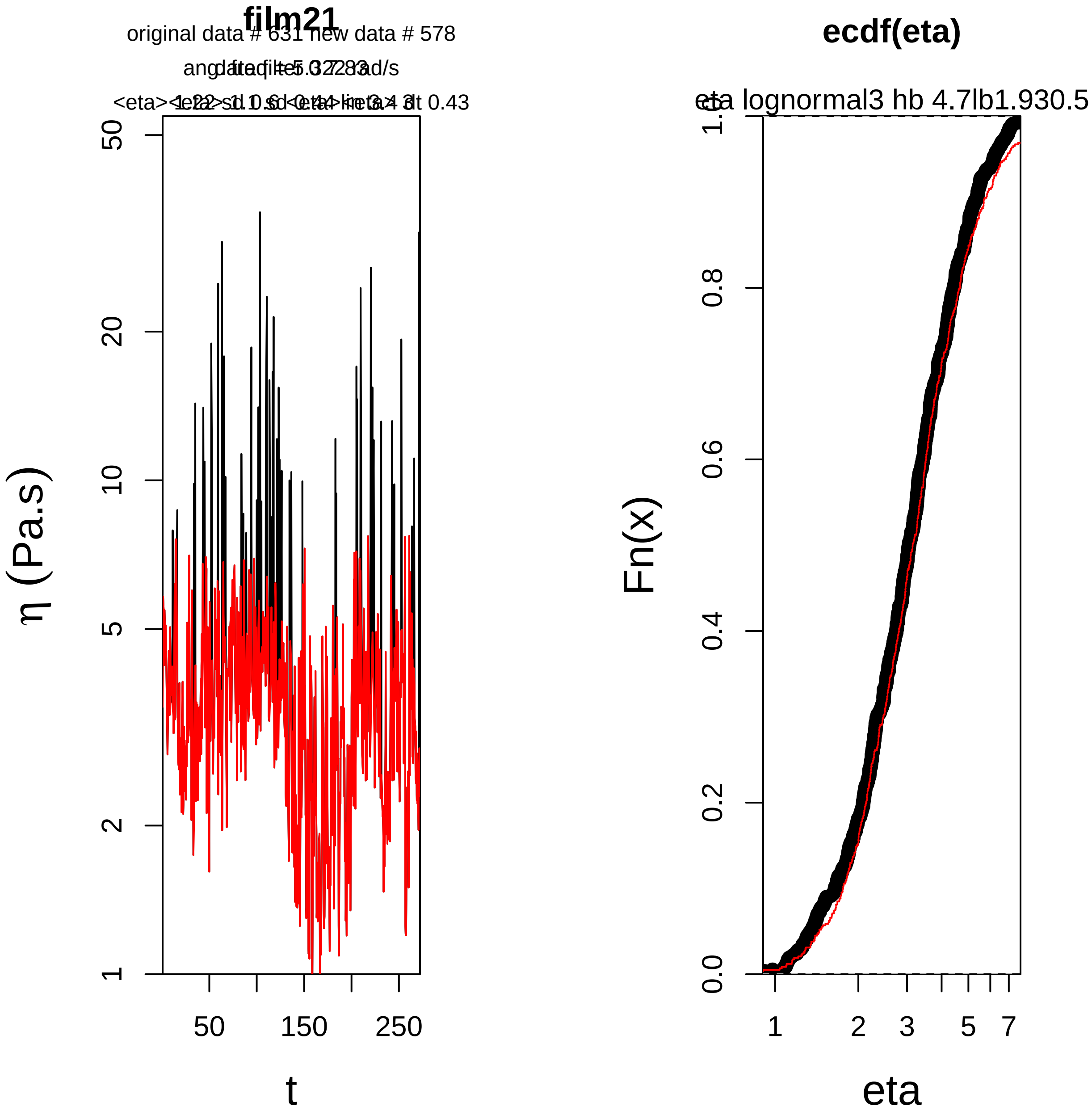

tau = 0.954sigma^2 = 0.077
Variogram
0.08
0.10
0.12
0.14
0.16
0.18
0.20
0
5
15
25
Lag l

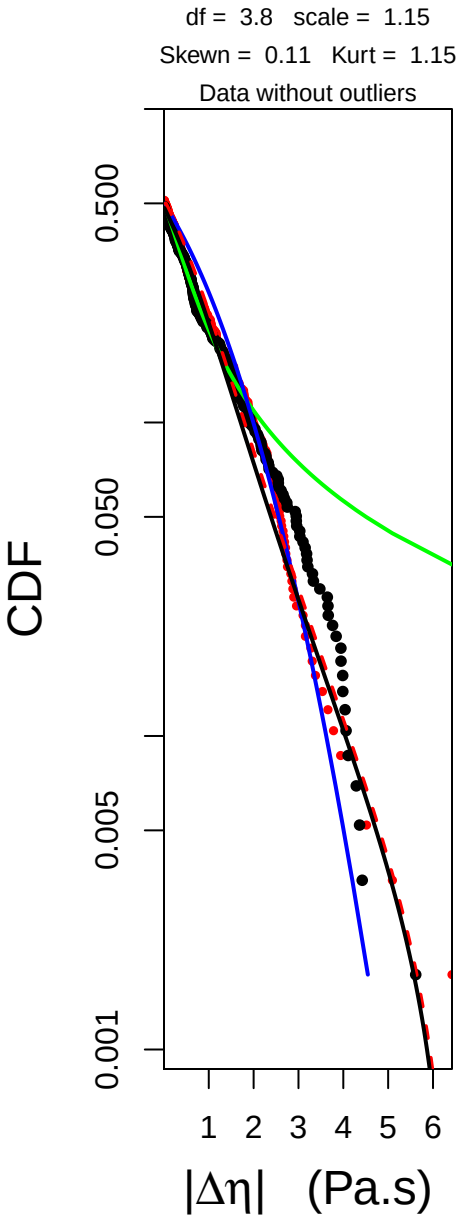

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
−0.020
0.000
0.015
residuals(variogramfit)

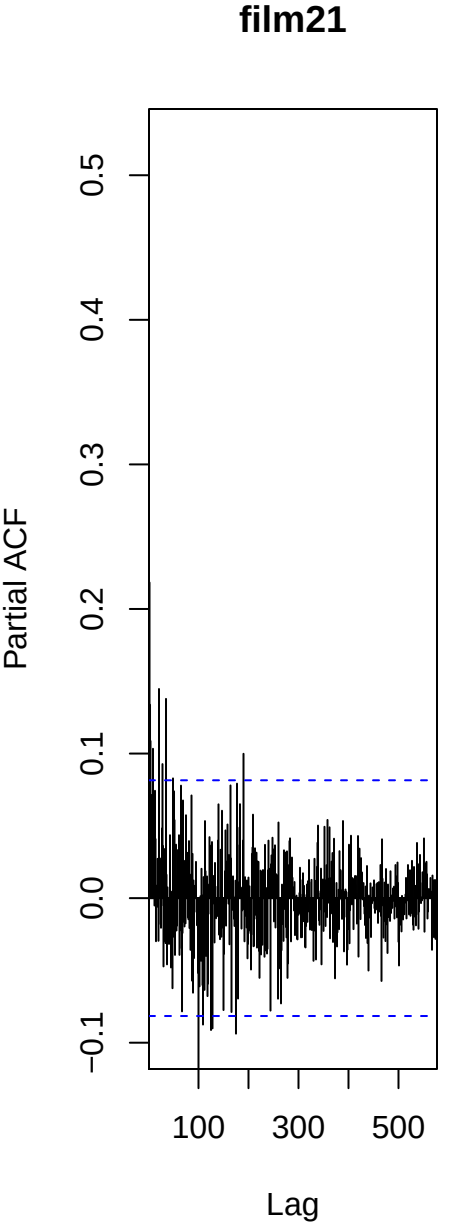

Volatility proxy
0.2
0.4
0.6
0.8
1.0
50
150
250
t

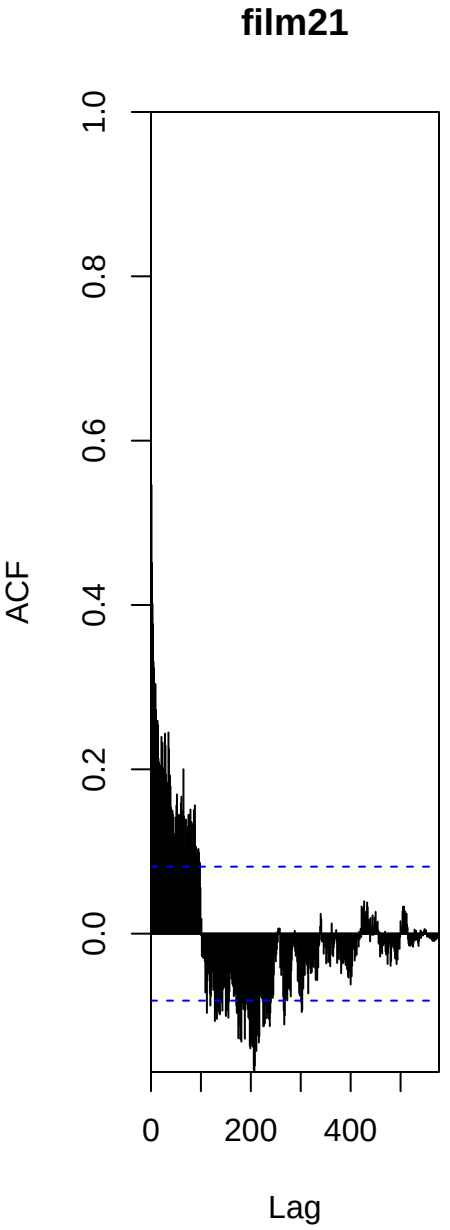

Volatility Clustering
cte = 0.068
Variogram
0.050
0.055
0.060
0.065
0.070
0.075
0.080
0
100
200
300
Lag l

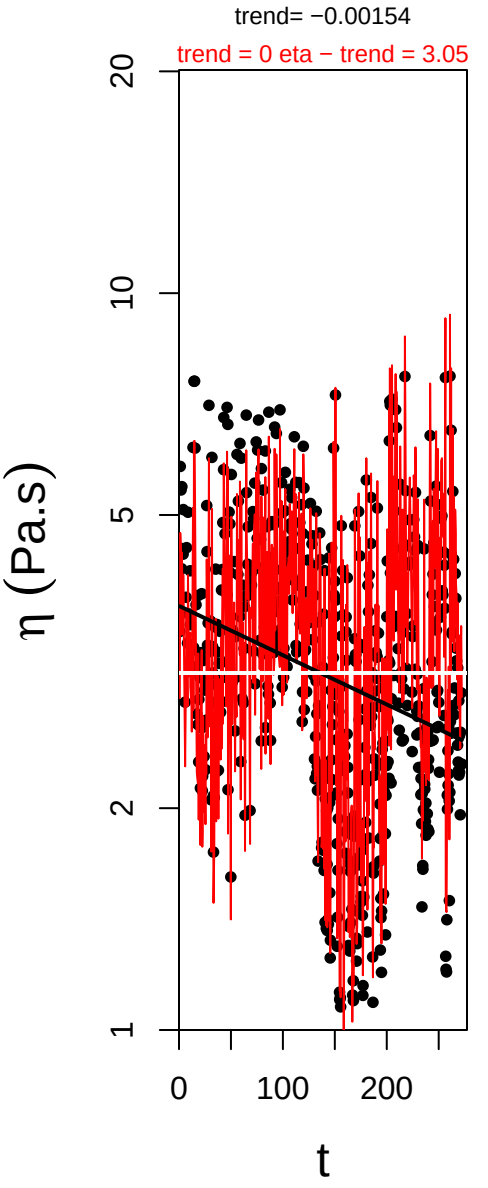

Histogram of residuals(variogramfit)
Frequency
0
10
20
30
40
50
60
70
−0.010
0.000
0.010
residuals(variogramfit)

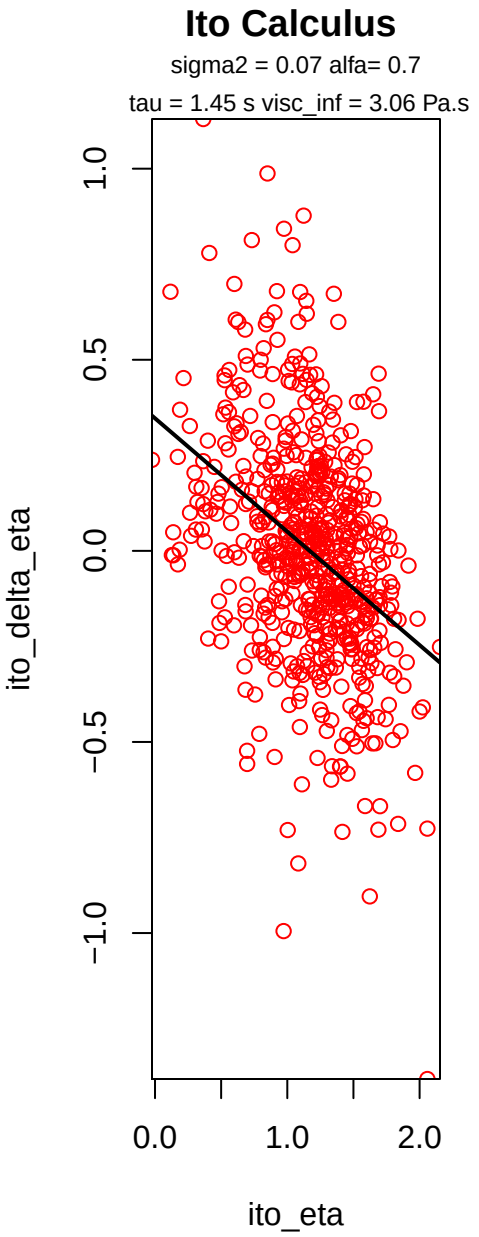

film21
original data # 631 new data # 578
ecdf(eta)
eta lognormal3 hb 4.7lb1.930.5
η (Pa.s)
t
Fn(x)
eta

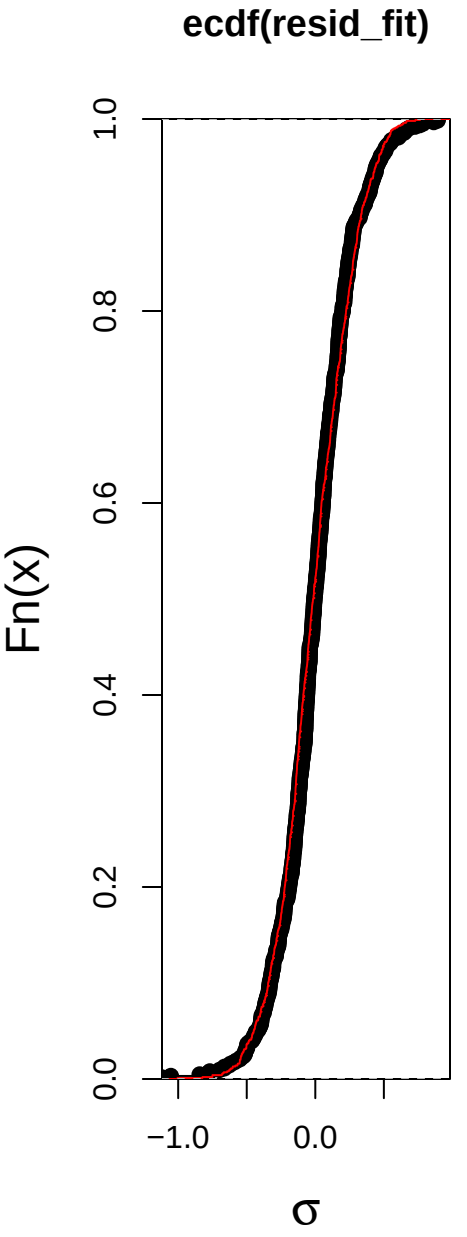

df = 3.8 scale = 1.15
Skewn = 0.11 Kurt = 1.15
Data without outliers
CDF
0.500
0.050
0.005
0.001
1
2
3
4
5
6
|Δη| (Pa.s)

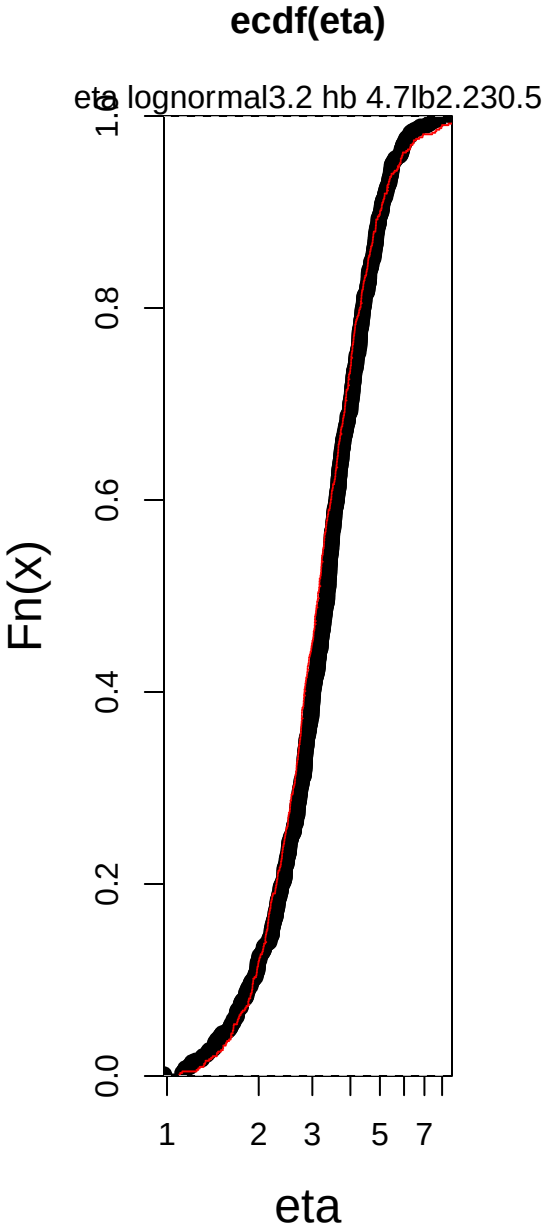

film21
Partial ACF
0.5
0.4
0.3
0.2
0.1
0.0
−0.1
100
300
500
Lag

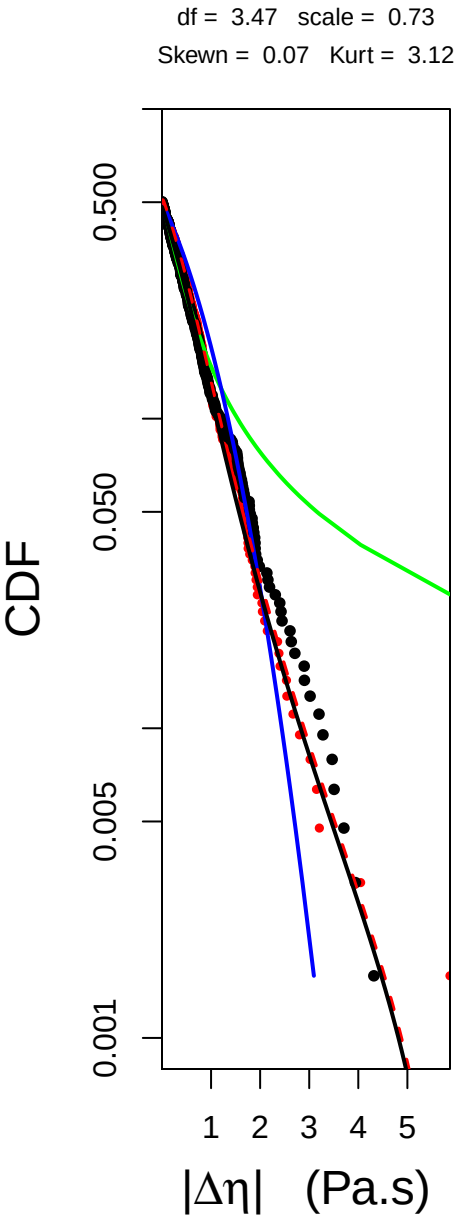

film21
ACF
1.0
0.8
0.6
0.4
0.2
0.0
0
200
400
Lag


trend= −0.00154
trend = 0 eta − trend = 3.05
η (Pa.s)
20
10
5
2
1
0
100
200
t

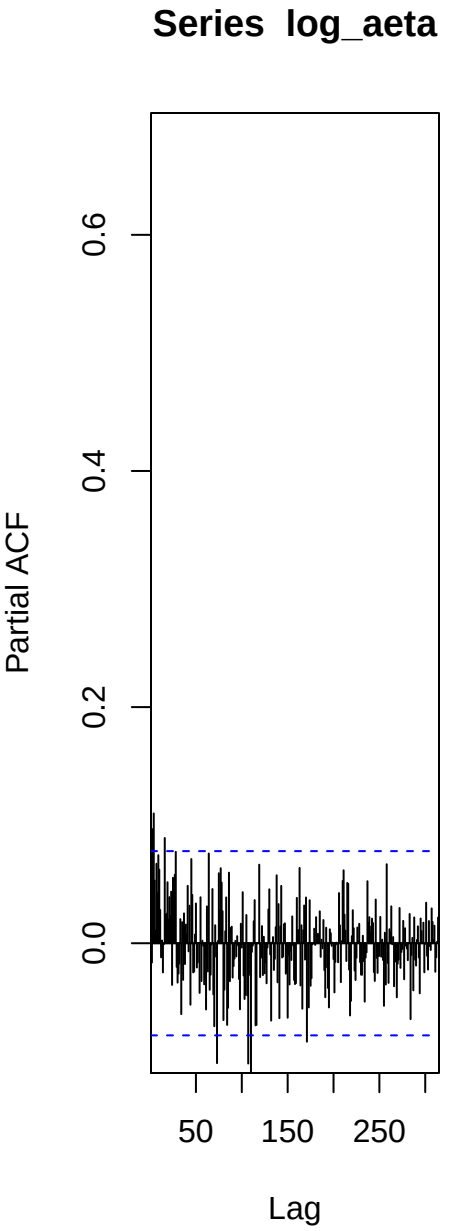

Ito Calculus
sigma2 = 0.07 alfa= 0.7
tau = 1.45 s visc_inf = 3.06 Pa.s
ito_delta_eta
1.0
0.5
0.0
−0.5
−1.0
0.0
1.0
2.0
ito_eta

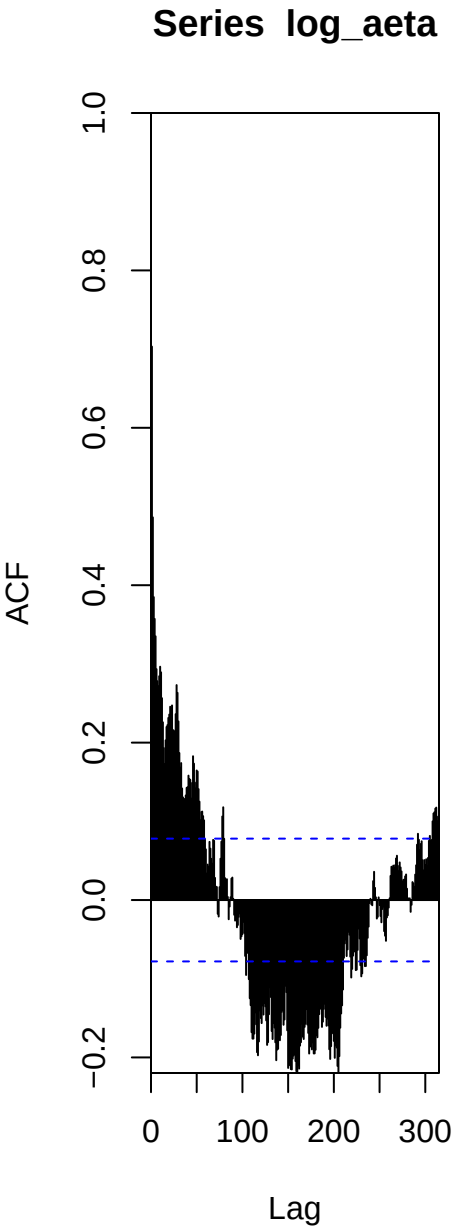

ecdf(resid_fit)
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
−1.0
0.0
σ

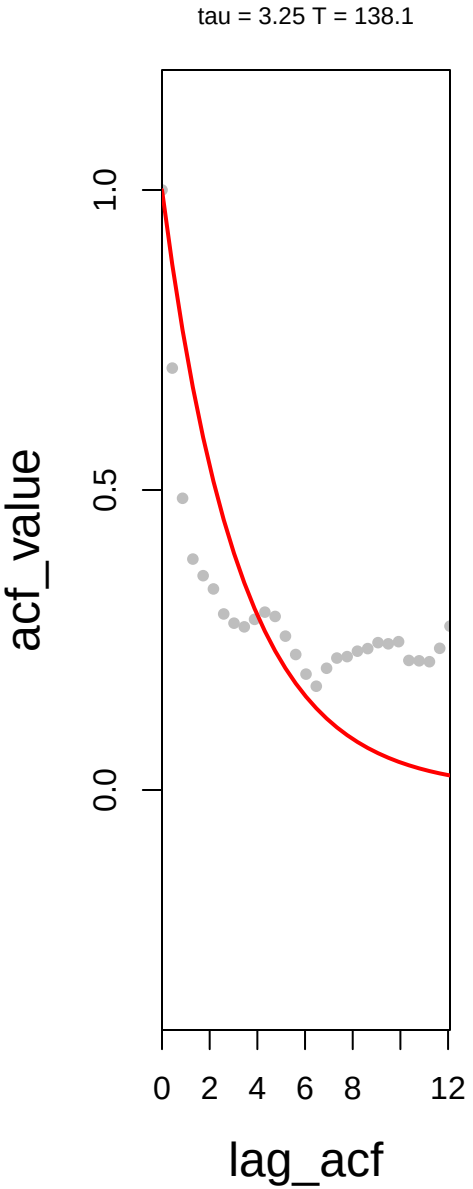


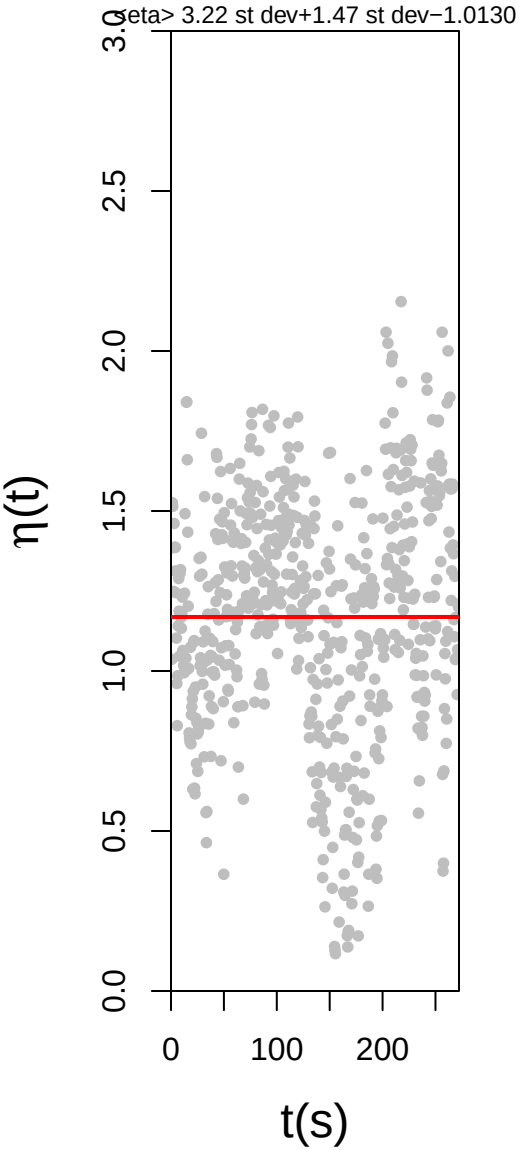


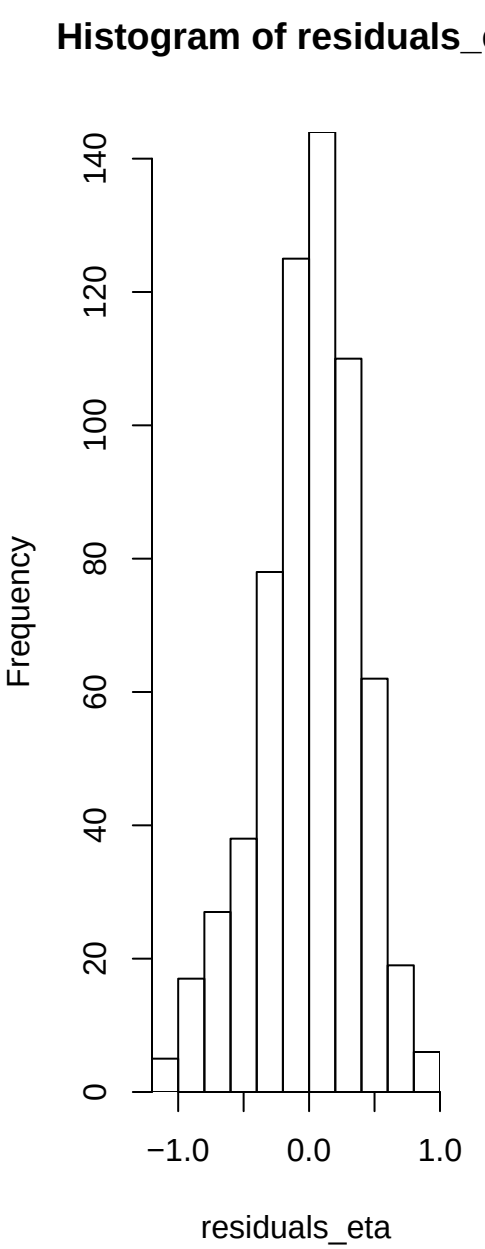
riginal data #

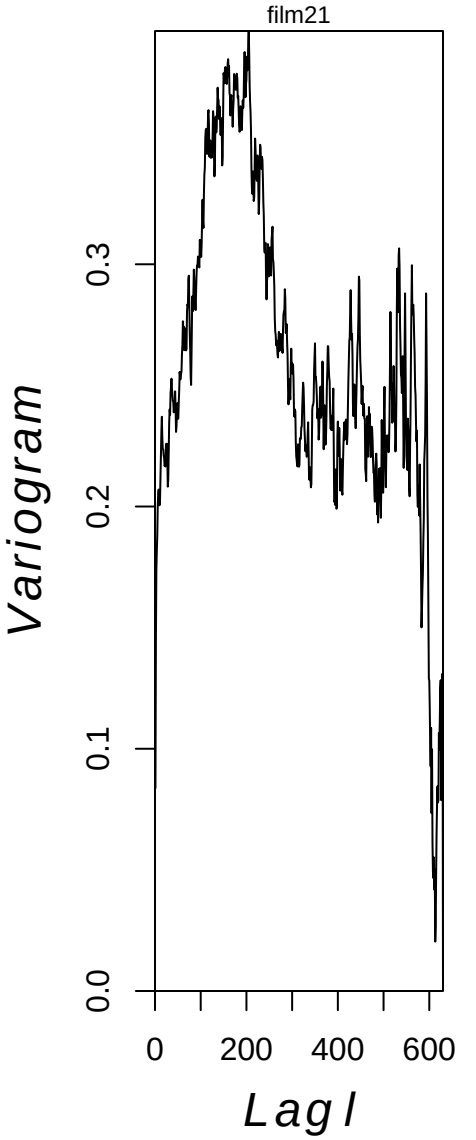

Series log_aeta
Partial ACF
0.0
0.2
0.4
0.6
50
150
250
Lag

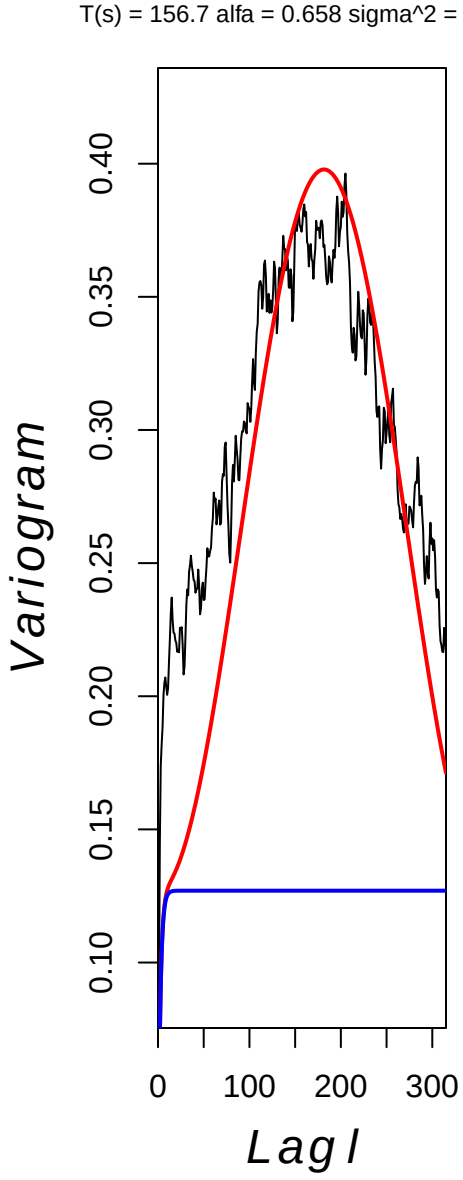

Series log_aeta
ACF
−0.2
0.0
0.2
0.4
0.6
0.8
1.0
0
100
200
300
Lag

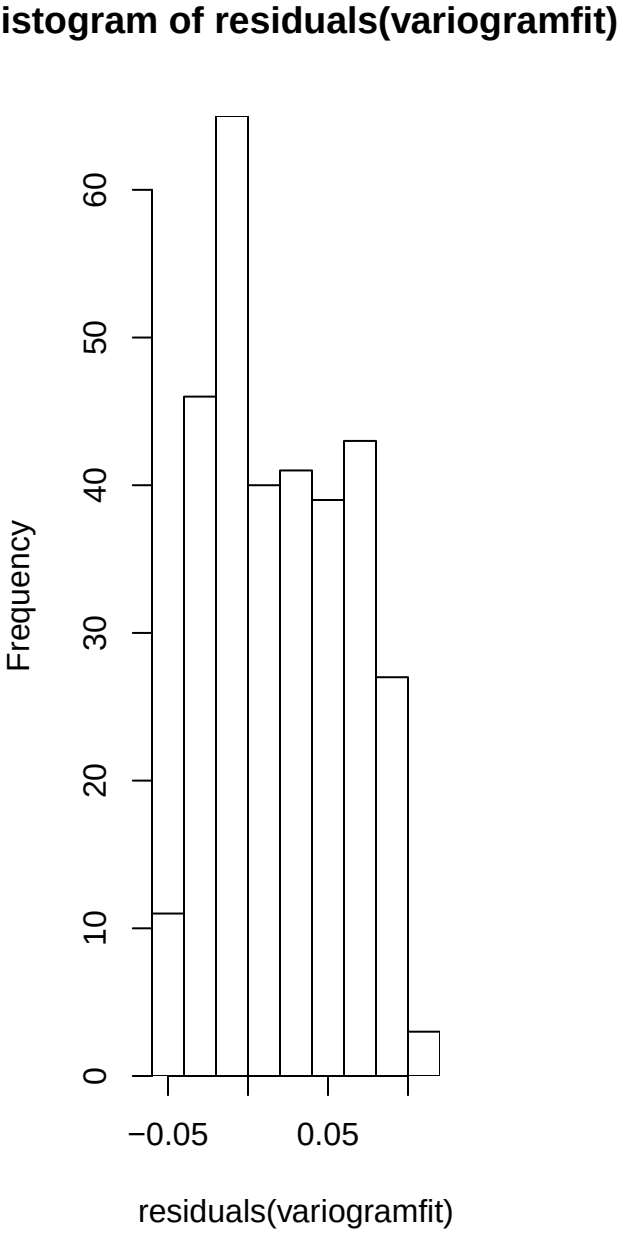

tau = 3.25 T = 138.1
acf_value
0.0
0.5
1.0
0
2
4
6
8
12
lag_acf

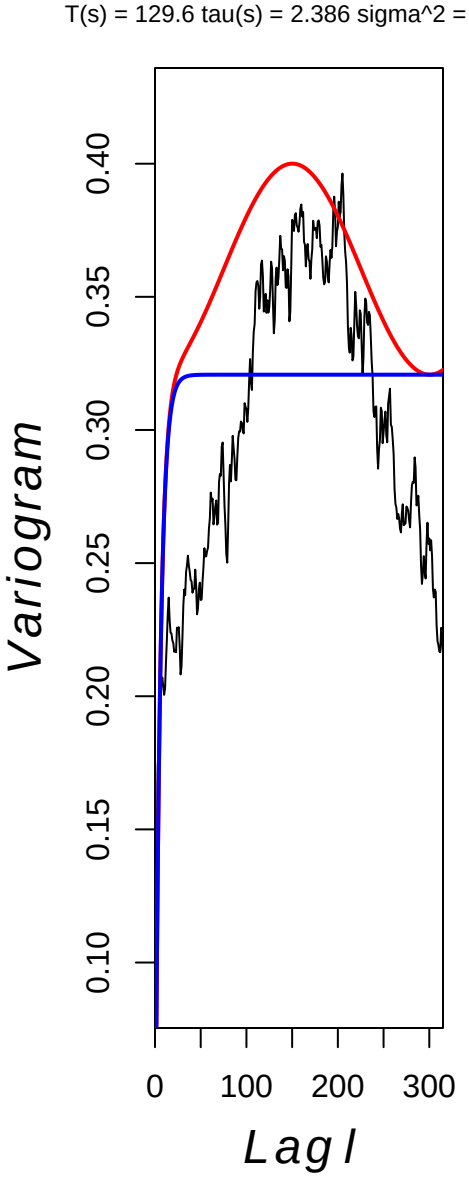

eta> 3.22 st dev+1.47 st dev−1.0130
η(t)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
100
200
t(s)

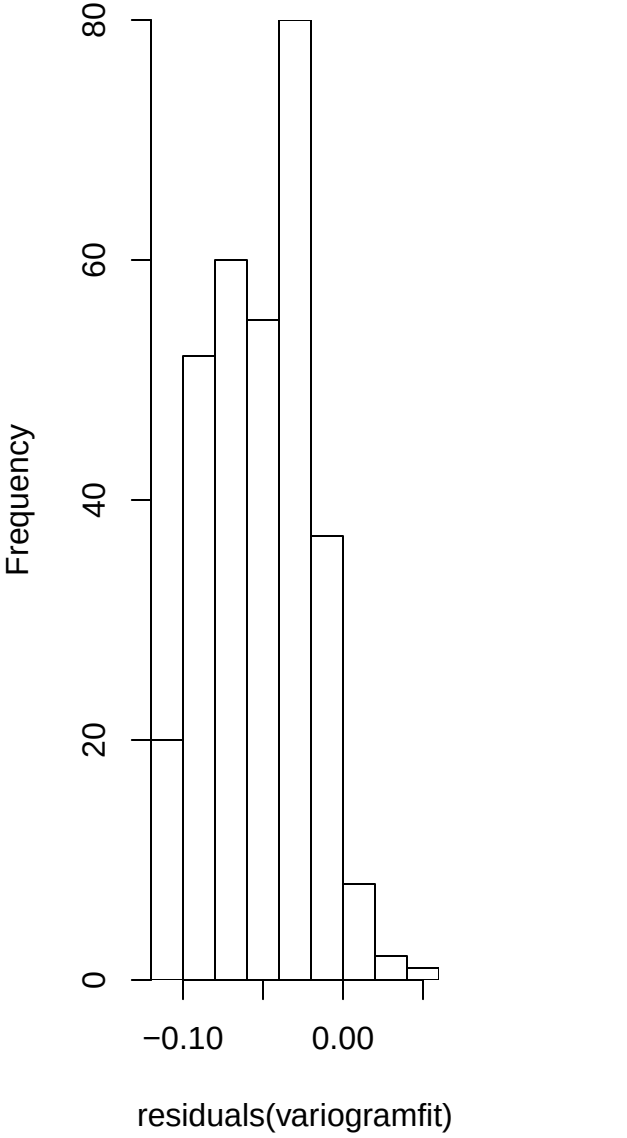

Histogram of residuals_eta
Frequency
0
20
40
60
80
100
120
140
−1.0
0.0
1.0
residuals_eta

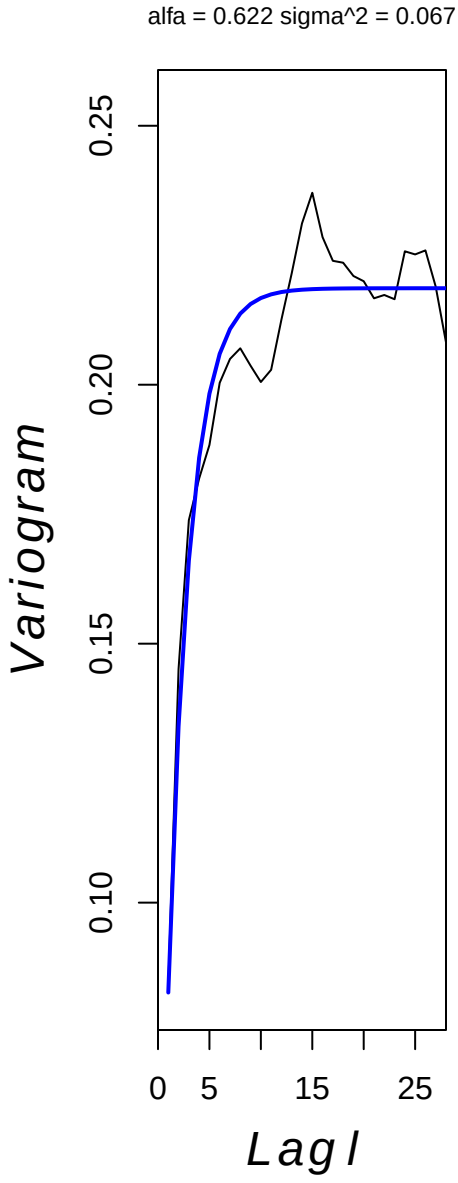

film21
Variogram
0.0
0.1
0.2
0.3
0
200
400
600
Lag l

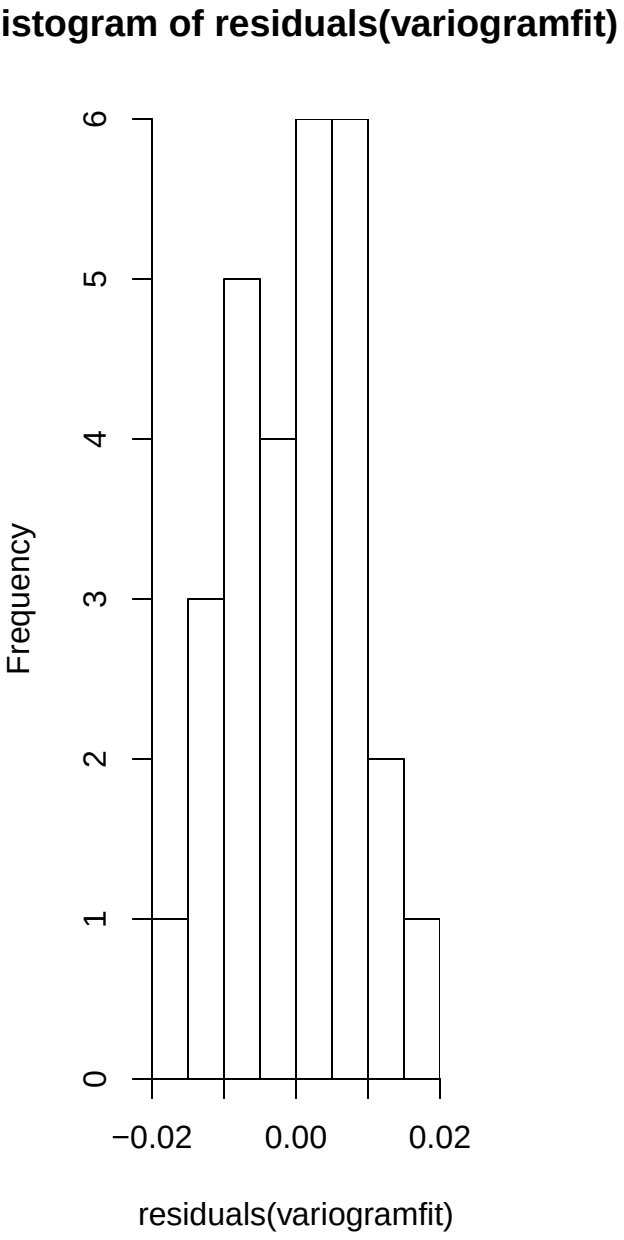

T(s) = 156.7 alfa = 0.658 sigma^2 = 0.036
Variogram
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0
100
200
300
Lag l

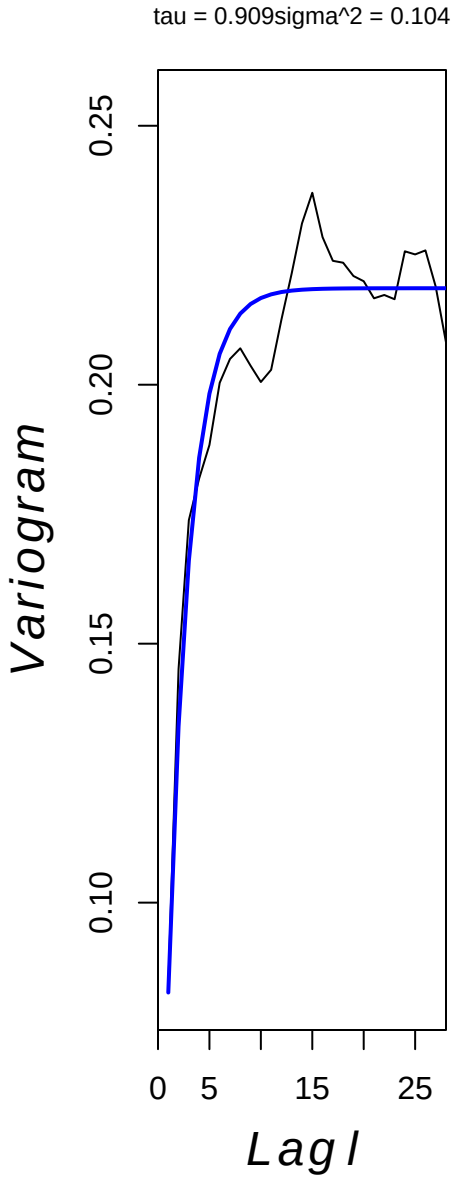

Histogram of residuals(variogramfit)
Frequency
0
10
20
30
40
50
60
−0.05
0.05
residuals(variogramfit)

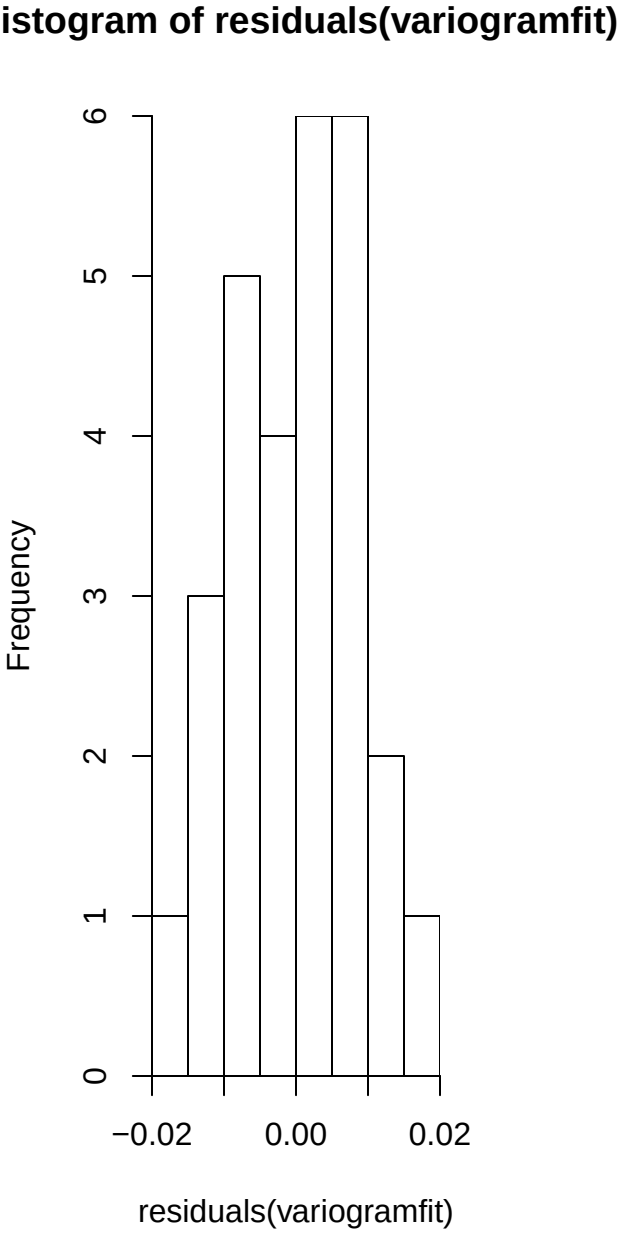

T(s) = 129.6 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0
100
200
300
Lag l

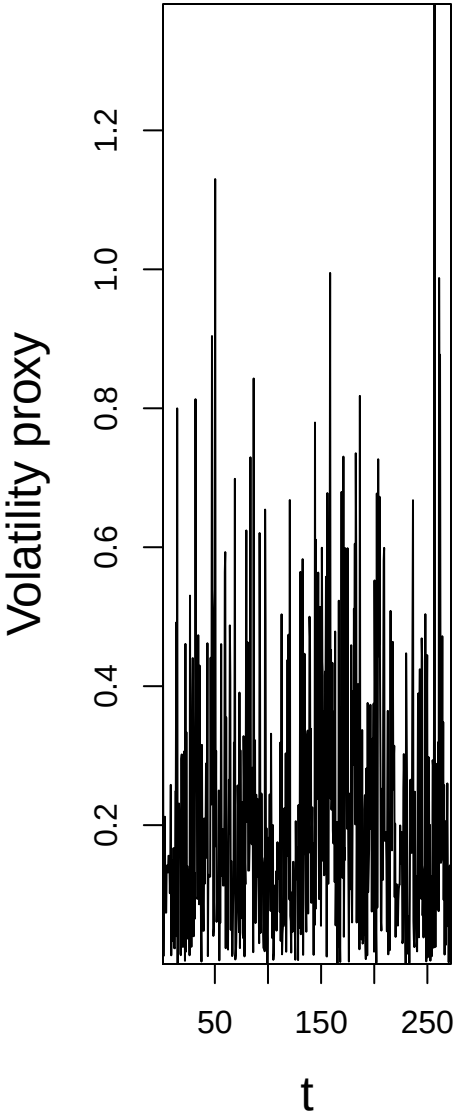

Histogram of residuals(variogramfit)
Frequency
0
20
40
60
80
−0.10
0.00
residuals(variogramfit)

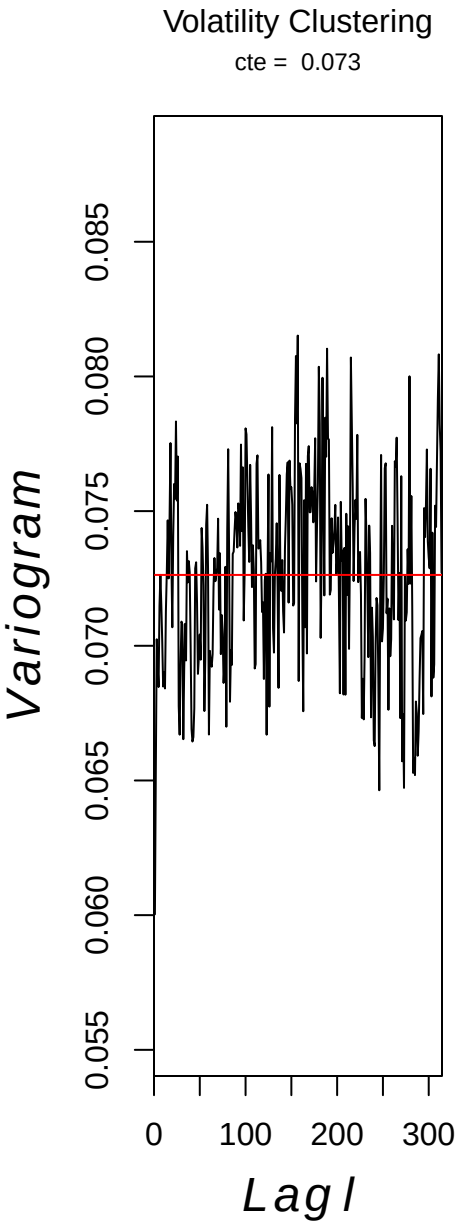

alfa = 0.622 sigma^2 = 0.067
Variogram
Lag l
0.10
0.15
0.20
0.25
0
5
15
25

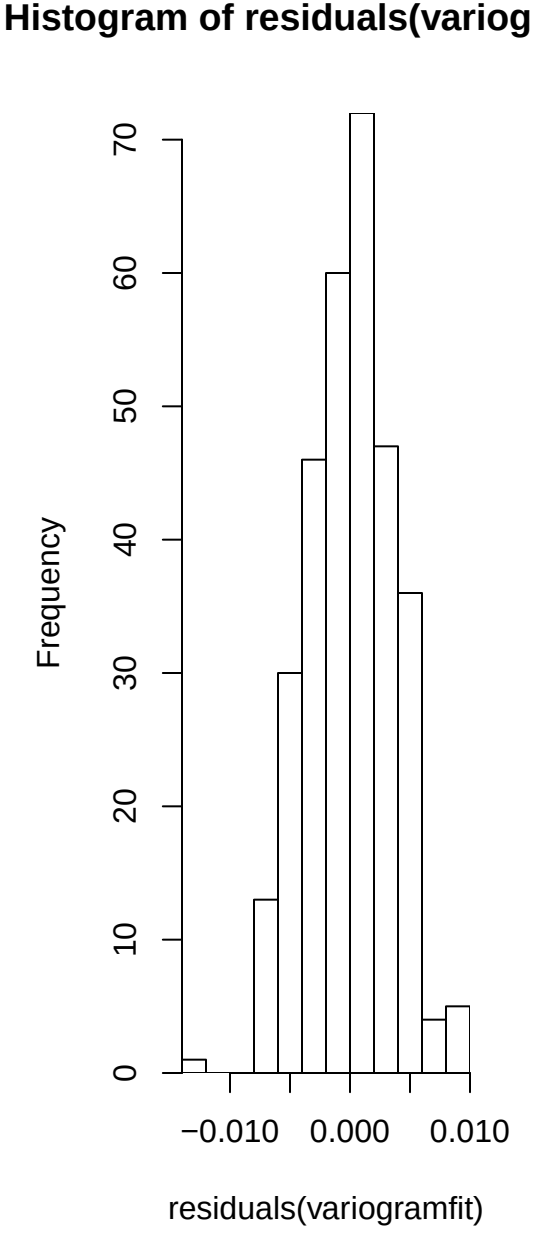

Histogram of residuals(variogramfit)
Frequency
residuals(variogramfit)
0
1
2
3
4
5
6
−0.02
0.00
0.02

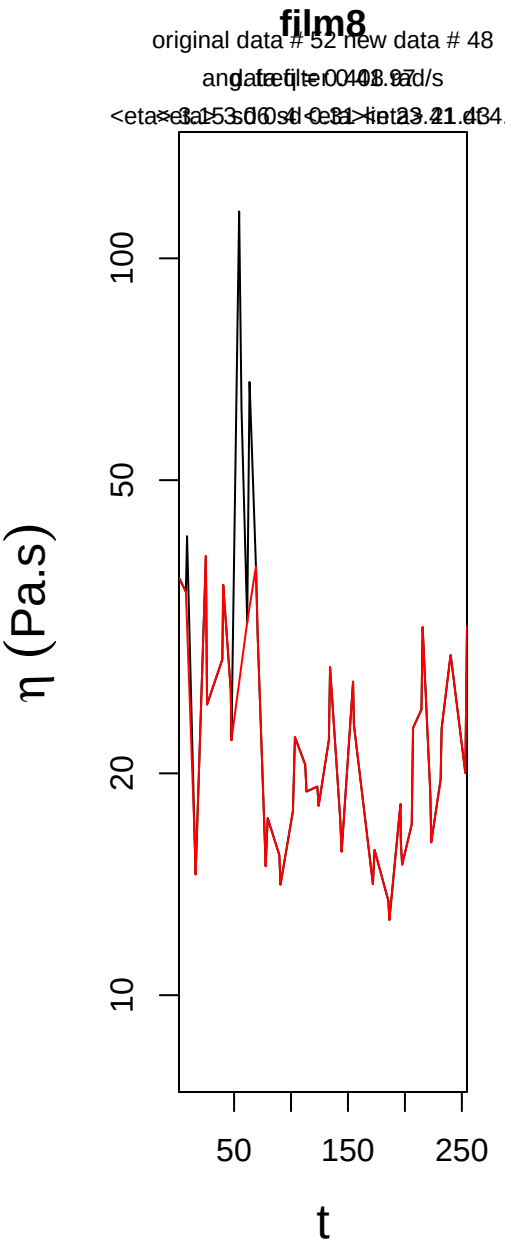

tau = 0.909sigma^2 = 0.104
Variogram
0.10
0.15
0.20
0.25
0
5
15
25
Lag l

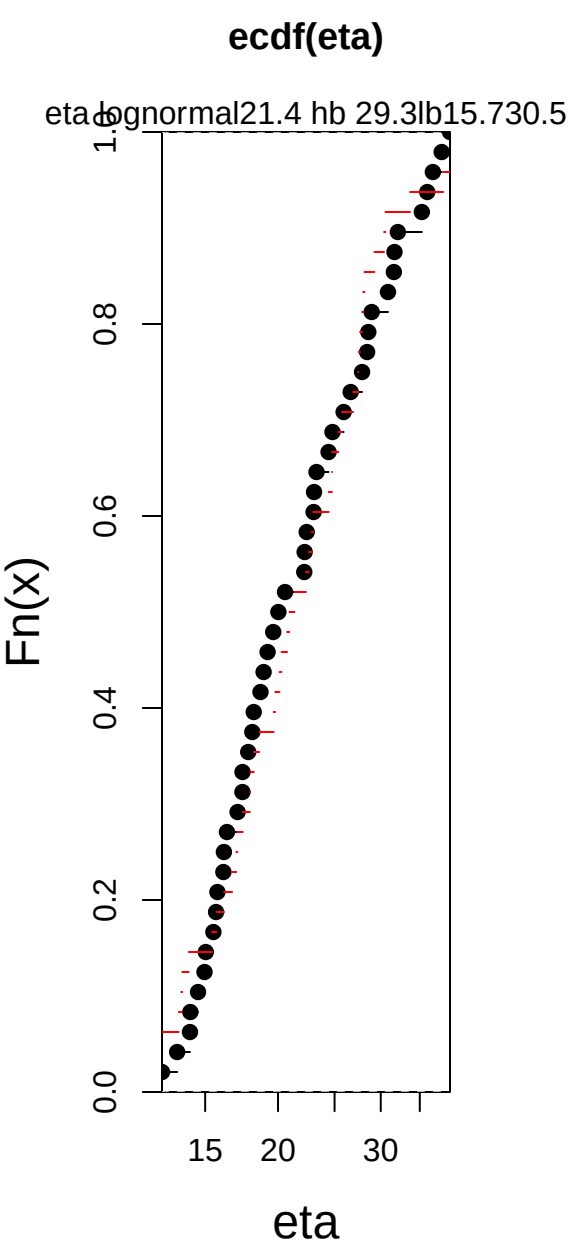

Histogram of residuals(variogramfit)
Frequency
0
1
2
3
4
5
6
−0.02
0.00
0.02
residuals(variogramfit)

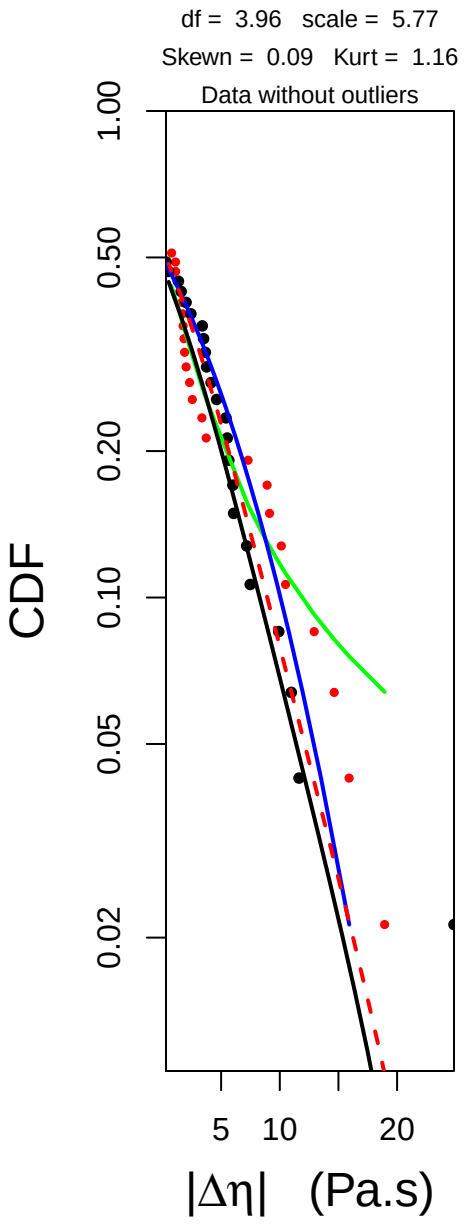

Volatility proxy
0.2
0.4
0.6
0.8
1.0
1.2
50
150
250
t

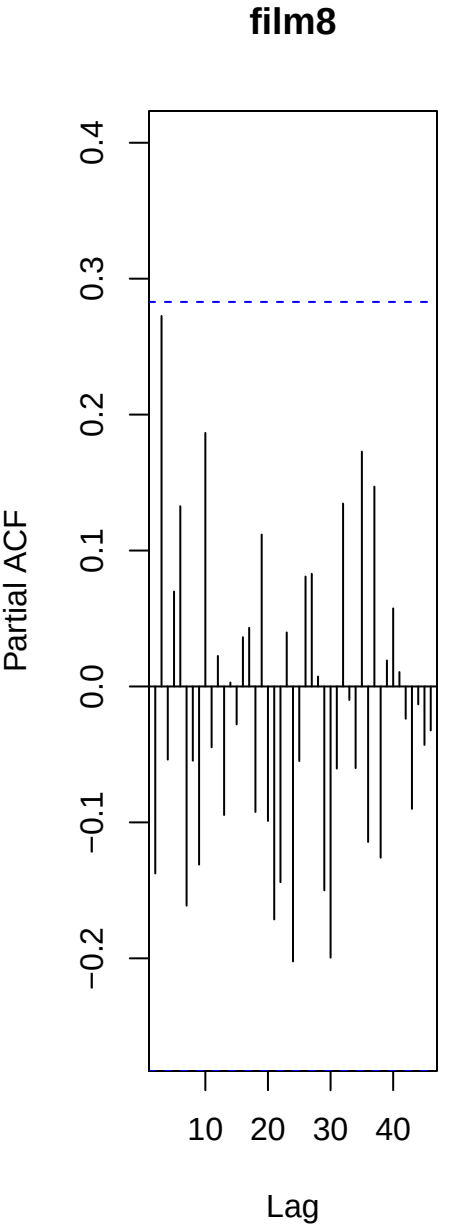

Volatility Clustering
cte = 0.073
Variogram
0.055
0.060
0.065
0.070
0.075
0.080
0.085
0
100
200
300
Lag l

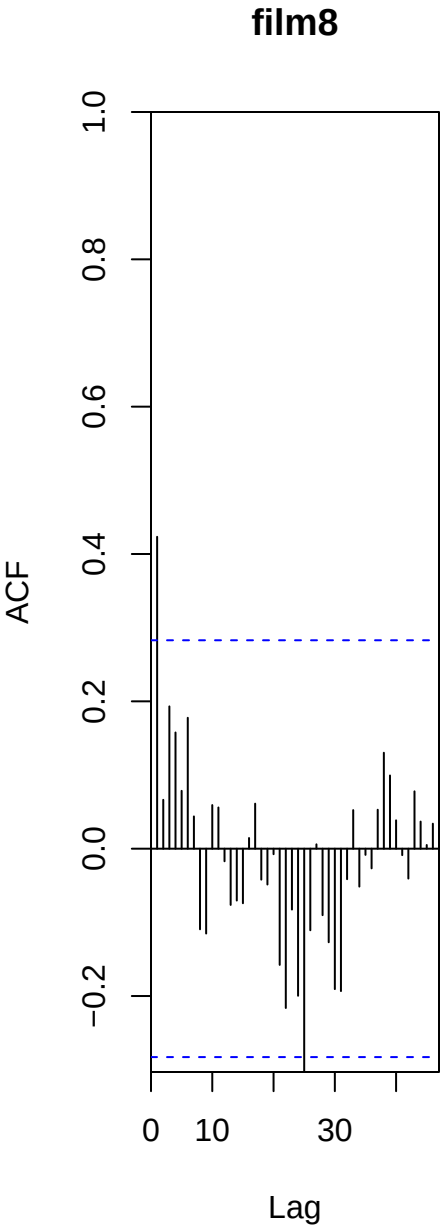

Histogram of residuals(variogramfit)
Frequency
0
10
20
30
40
50
60
70
−0.010
0.000
0.010
residuals(variogramfit)

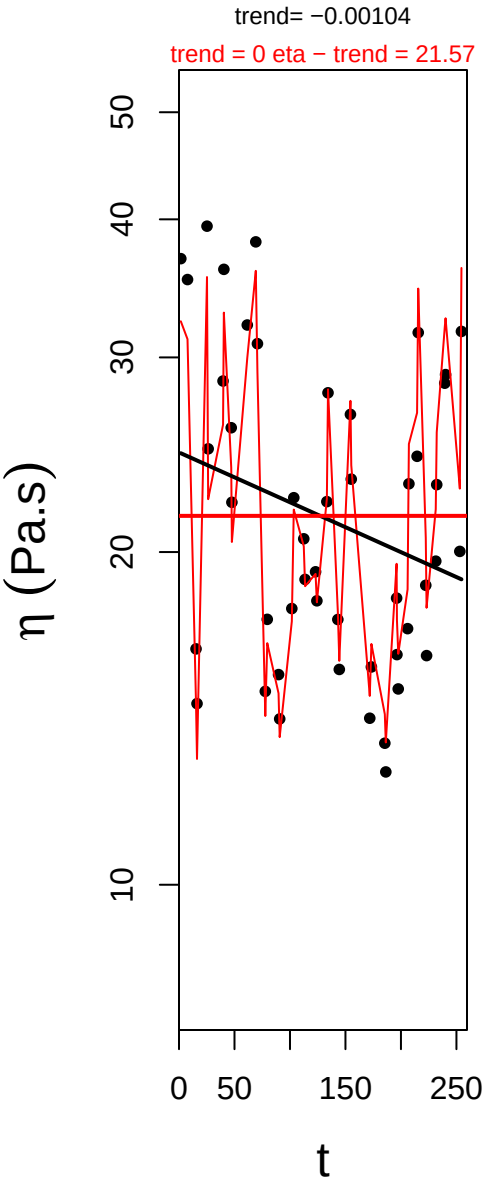

film8
original data # 52 new data # 48
<eta<23.21.4
η (Pa.s)
100
50
20
10
50
150
250
t

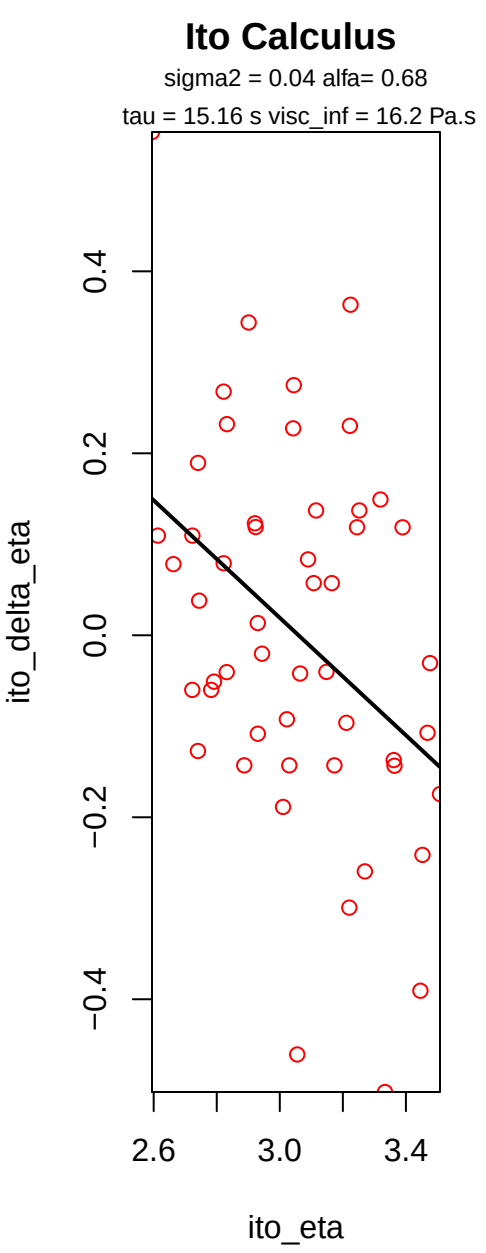

ecdf(eta)
eta lognormal21.4 hb 29.3lb15.730.5
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
15
20
30
eta

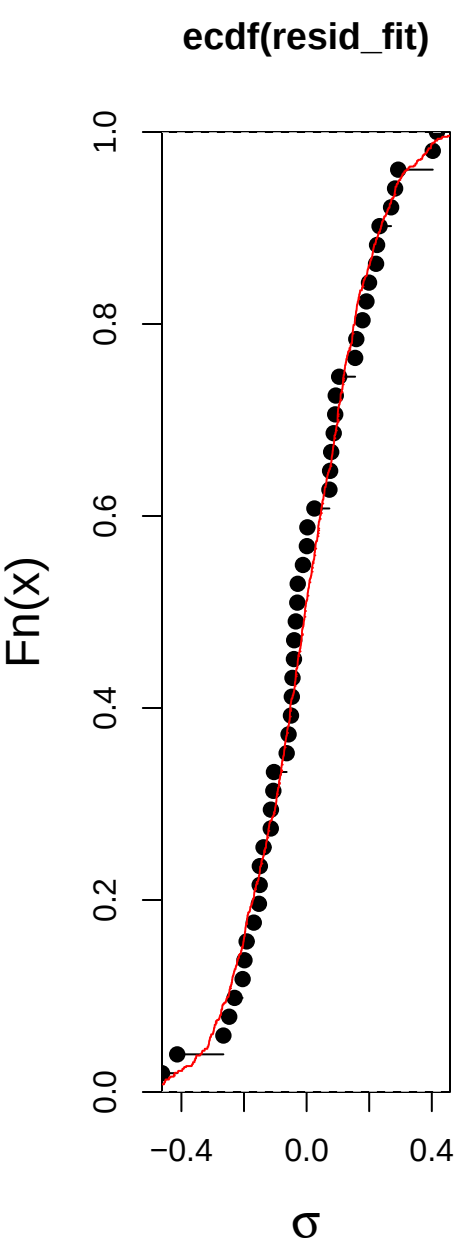

df = 3.96 scale = 5.77
Skewn = 0.09 Kurt = 1.16
Data without outliers
CDF
1.00
0.50
0.20
0.10
0.05
0.02
5
10
20
|Δη| (Pa.s)

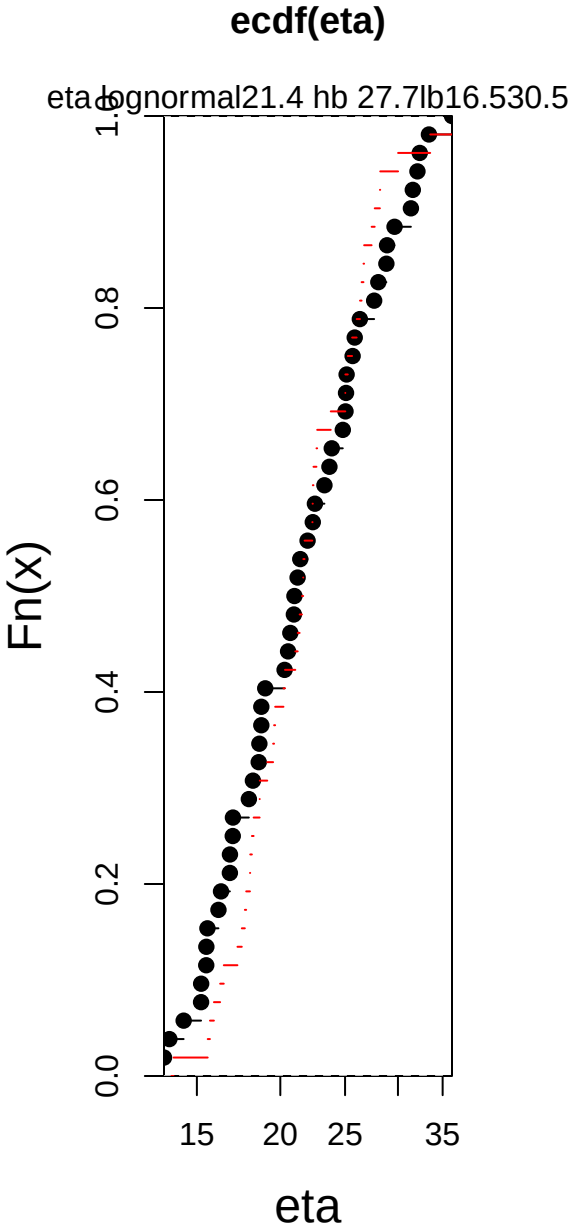

film8
Partial ACF
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
10
20
30
40
Lag

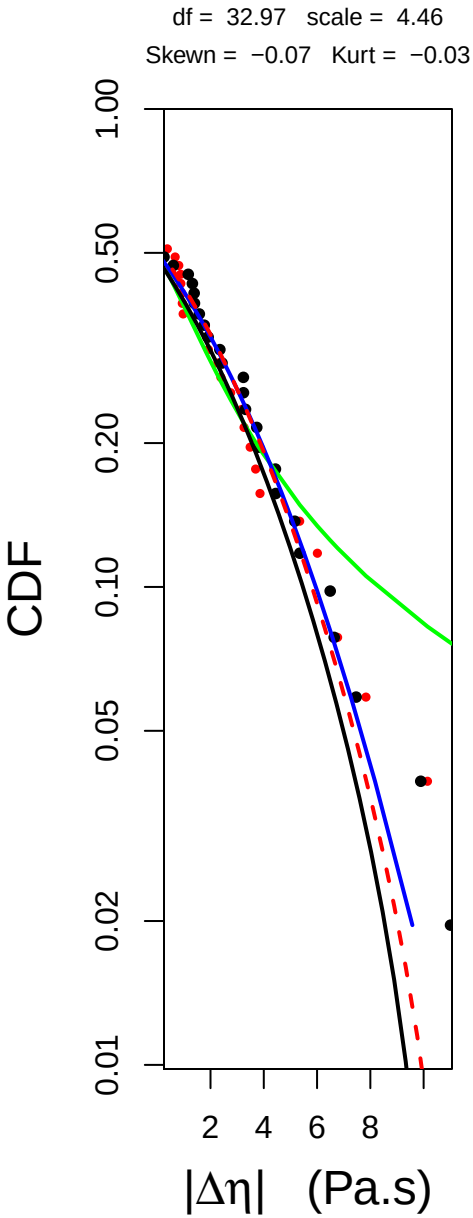

film8
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
10
30
Lag


trend= −0.00104
trend = 0 eta − trend = 21.57
η (Pa.s)
50
40
30
20
10
0
50
150
250
t

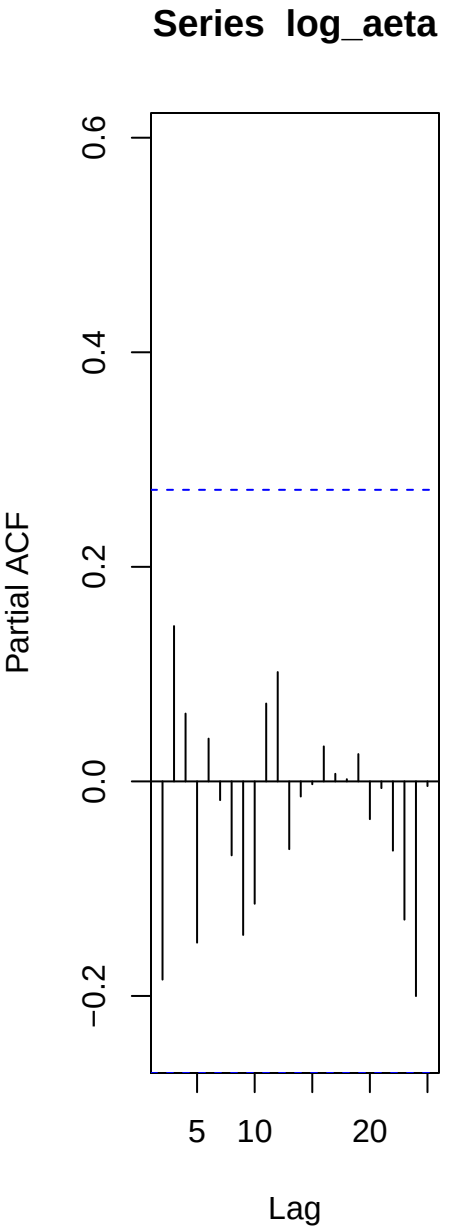

Ito Calculus
sigma2 = 0.04 alfa= 0.68
tau = 15.16 s visc_inf = 16.2 Pa.s
ito_delta_eta
0.4
0.2
0.0
−0.2
−0.4
2.6
3.0
3.4
ito_eta

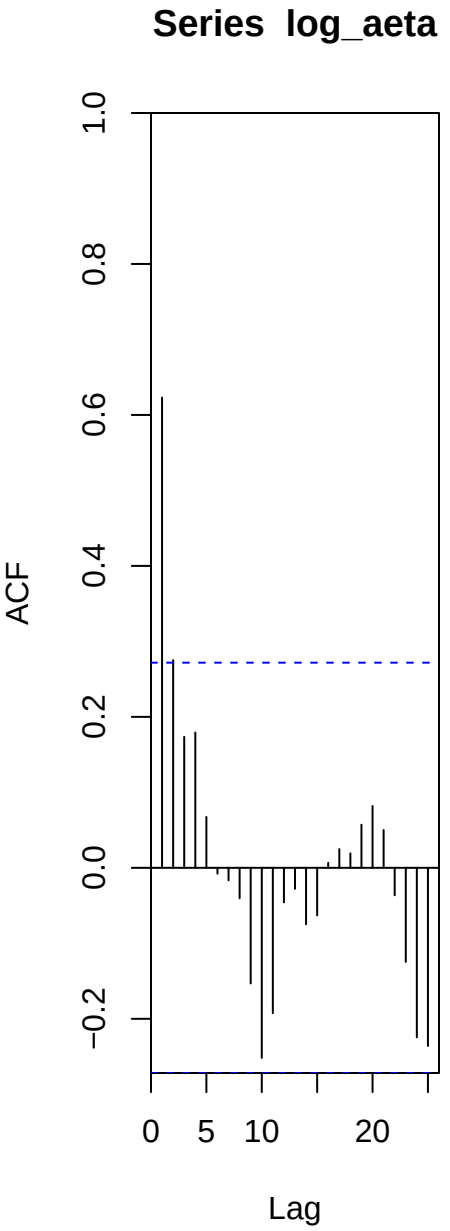

ecdf(resid_fit)
Fn(x)
1.0
0.8
0.6
0.4
0.2
0.0
−0.4
0.0
0.4
σ

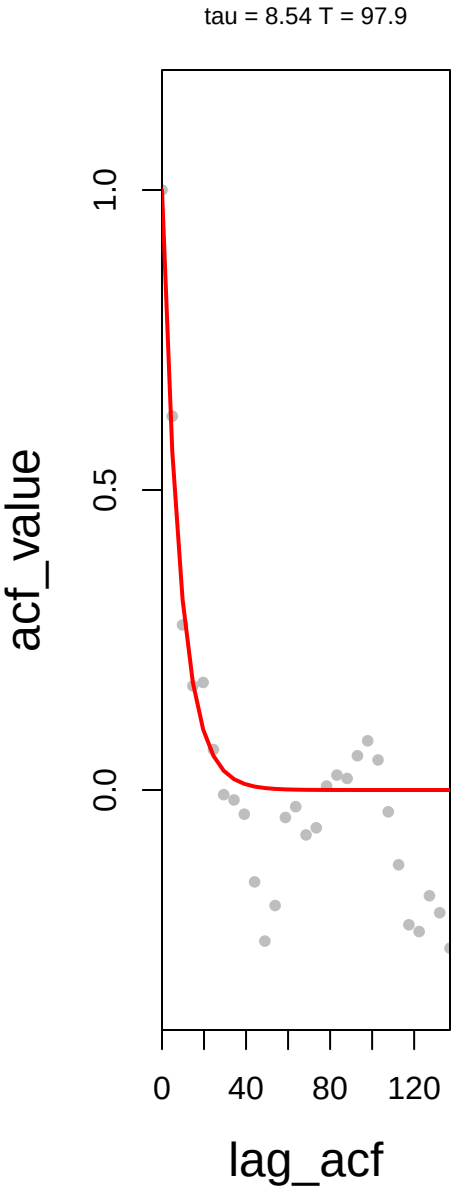


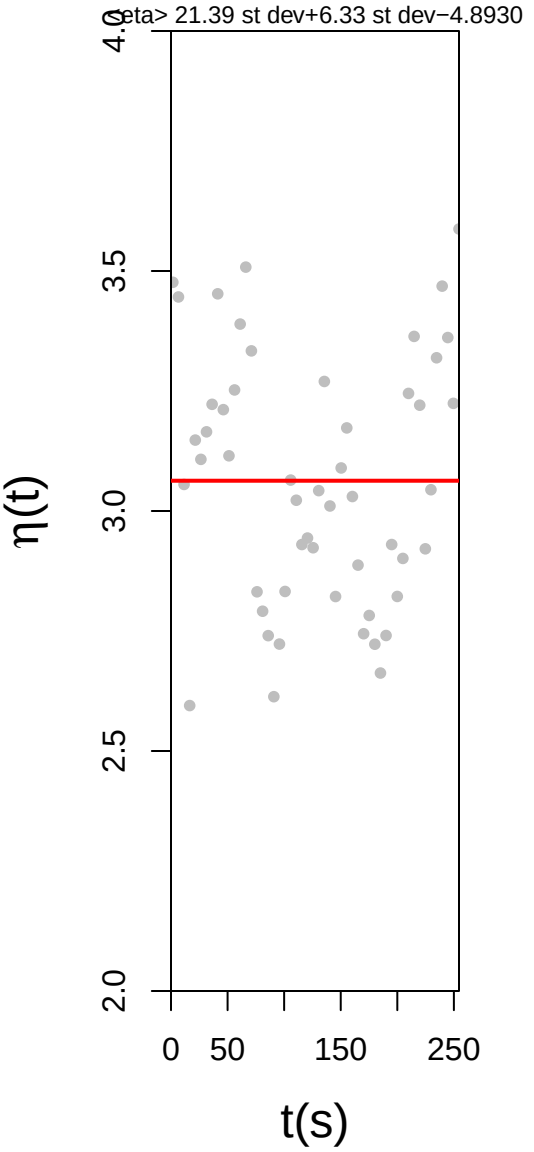


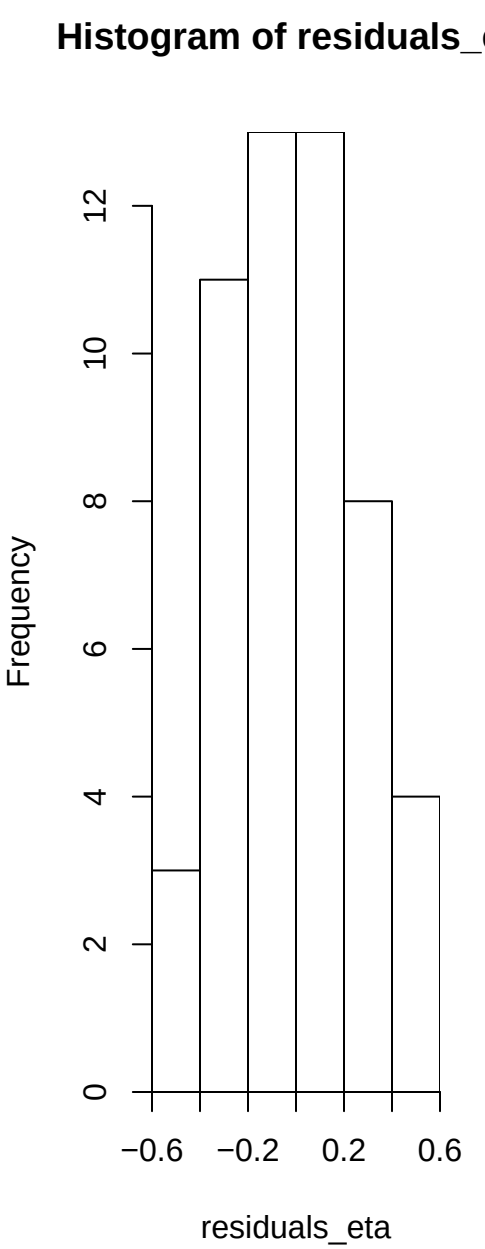
riginal data #

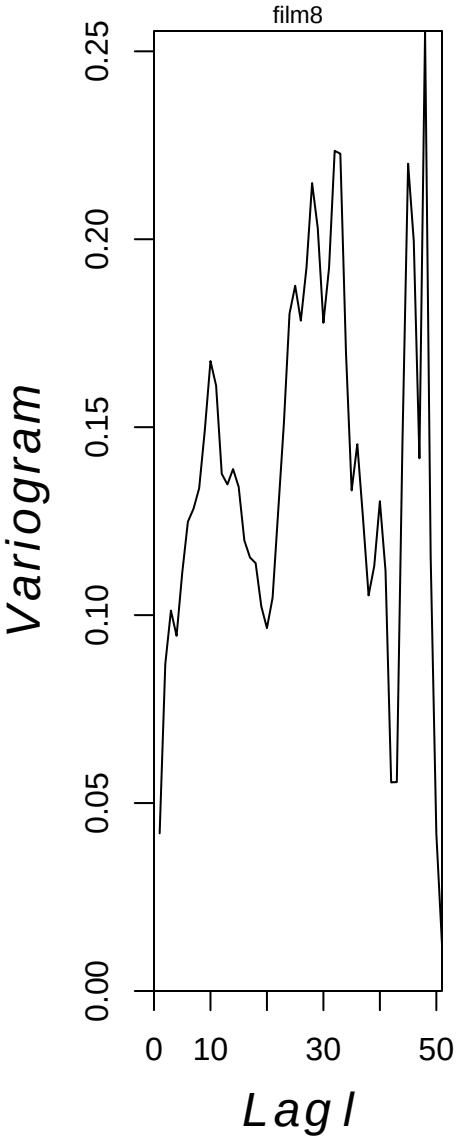

Series log_aeta
Partial ACF
0.6
0.4
0.2
0.0
−0.2
5
10
20
Lag

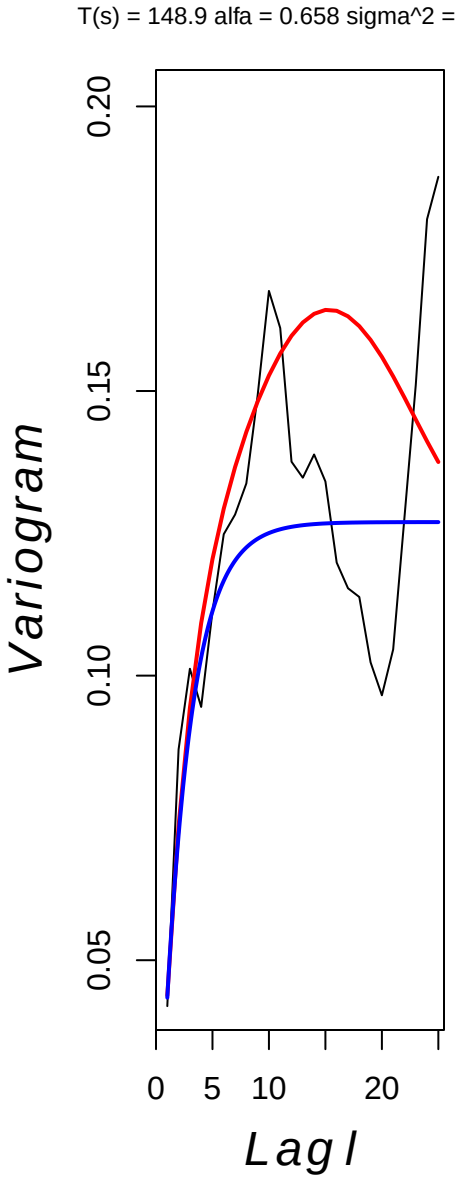

Series log_aeta
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
5
10
20
Lag

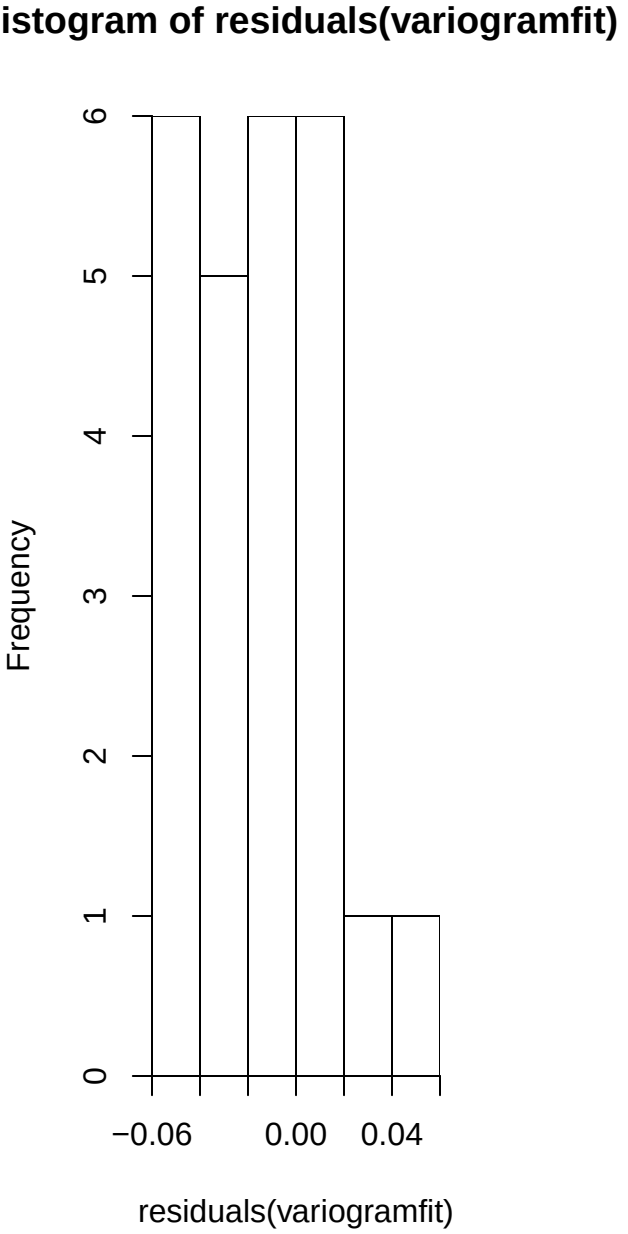

tau = 8.54 T = 97.9
acf_value
0.0
0.5
1.0
0
40
80
120
lag_acf

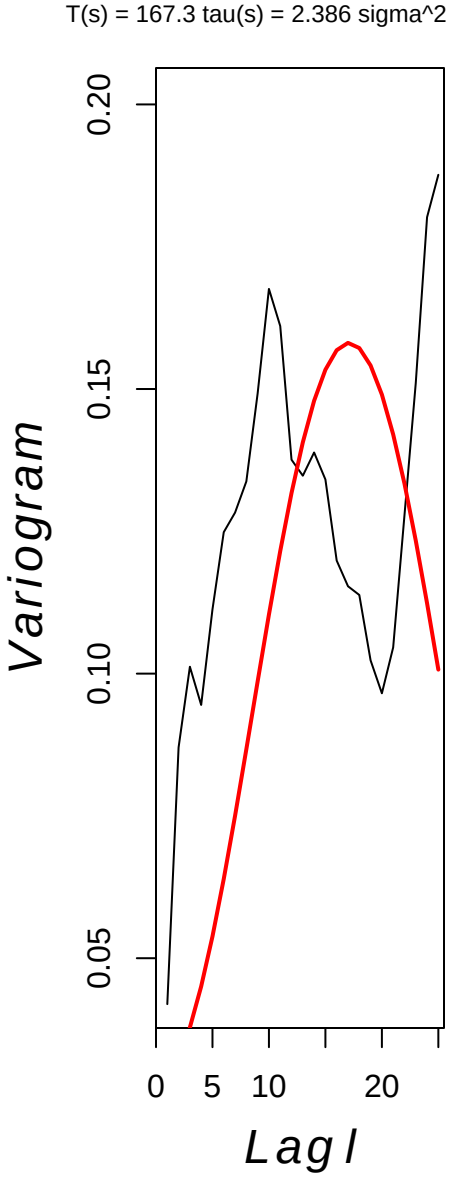

eta> 21.39 st dev+6.33 st dev−4.8930
η(t)
2.0
2.5
3.0
3.5
4.0
0
50
150
250
t(s)

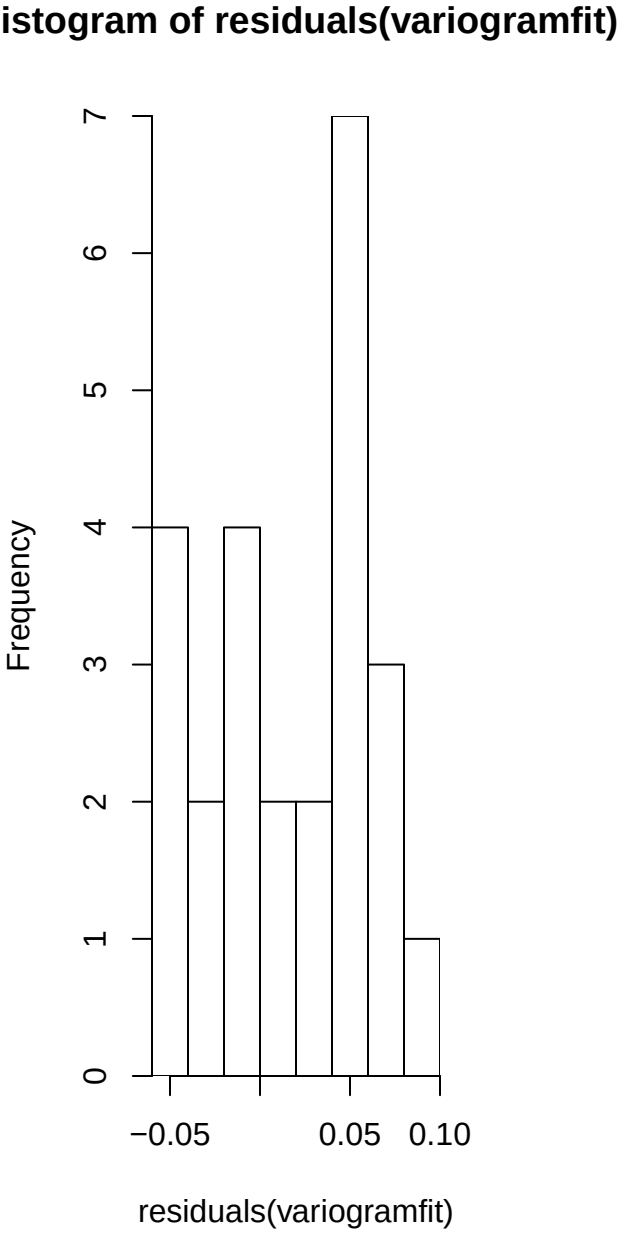

Histogram of residuals_eta
Frequency
0
2
4
6
8
10
12
−0.6
−0.2
0.2
0.6
residuals_eta

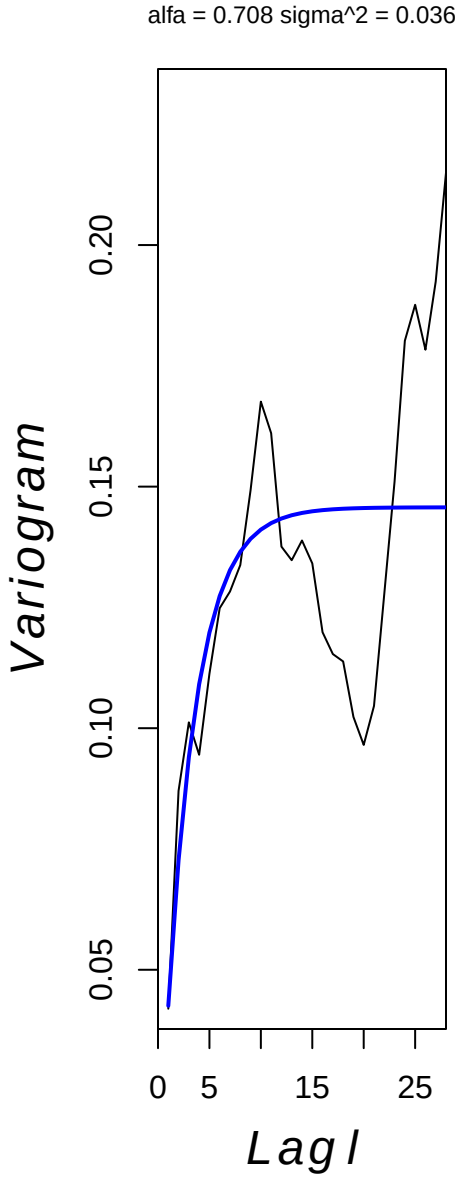

film8
Variogram
0.00
0.05
0.10
0.15
0.20
0.25
0
10
30
50
Lag l

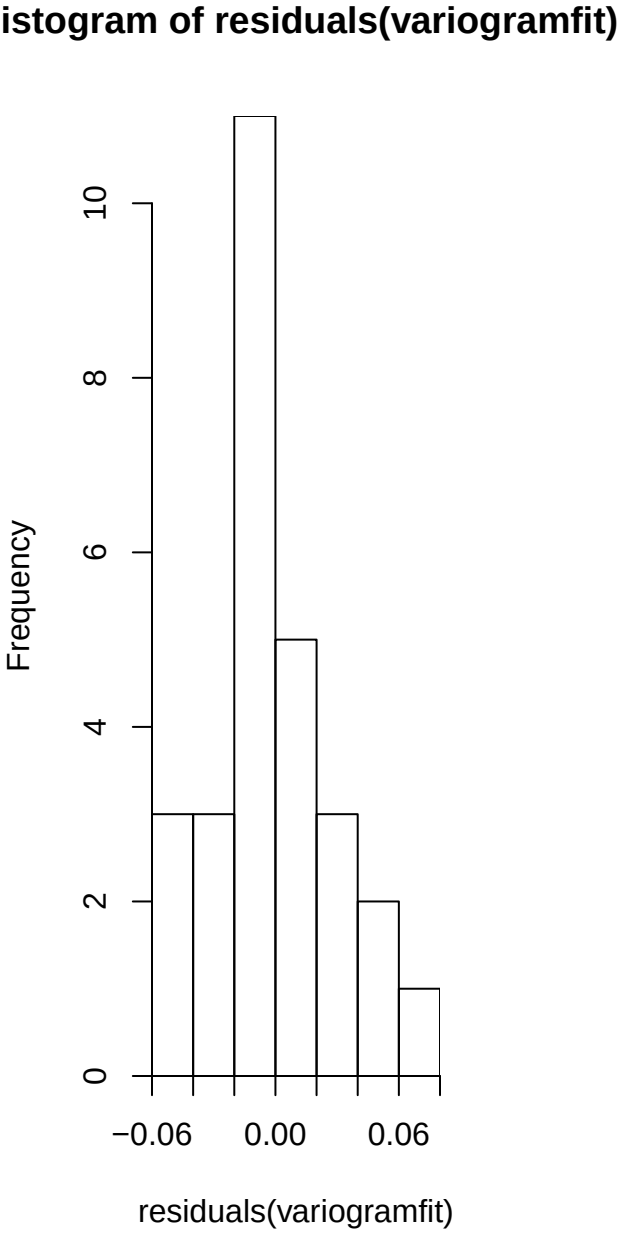

T(s) = 148.9 alfa = 0.658 sigma^2 = 0.036
Variogram
0.05
0.10
0.15
0.20
0
5
10
20
Lag l

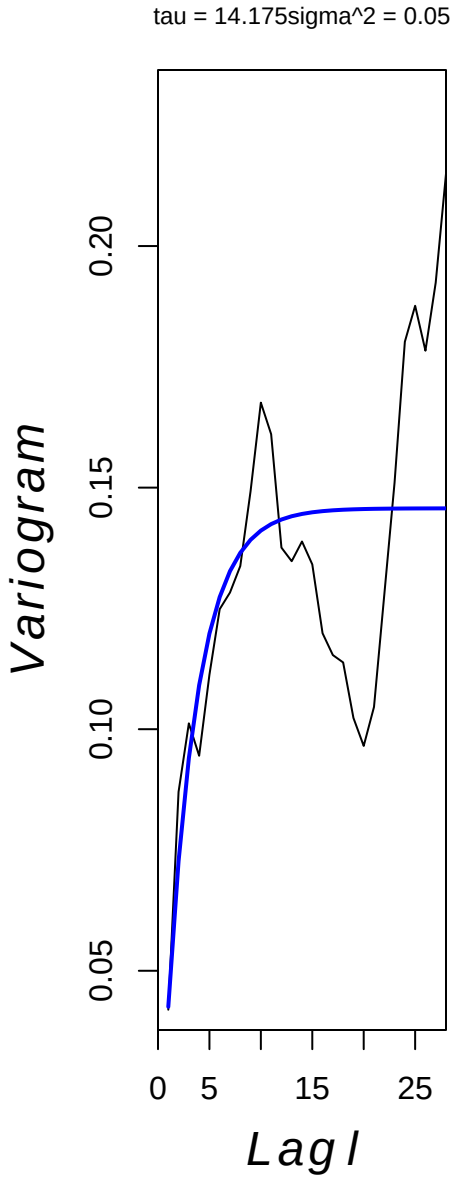

Histogram of residuals(variogramfit)
Frequency
0
1
2
3
4
5
6
−0.06
0.00
0.04
residuals(variogramfit)

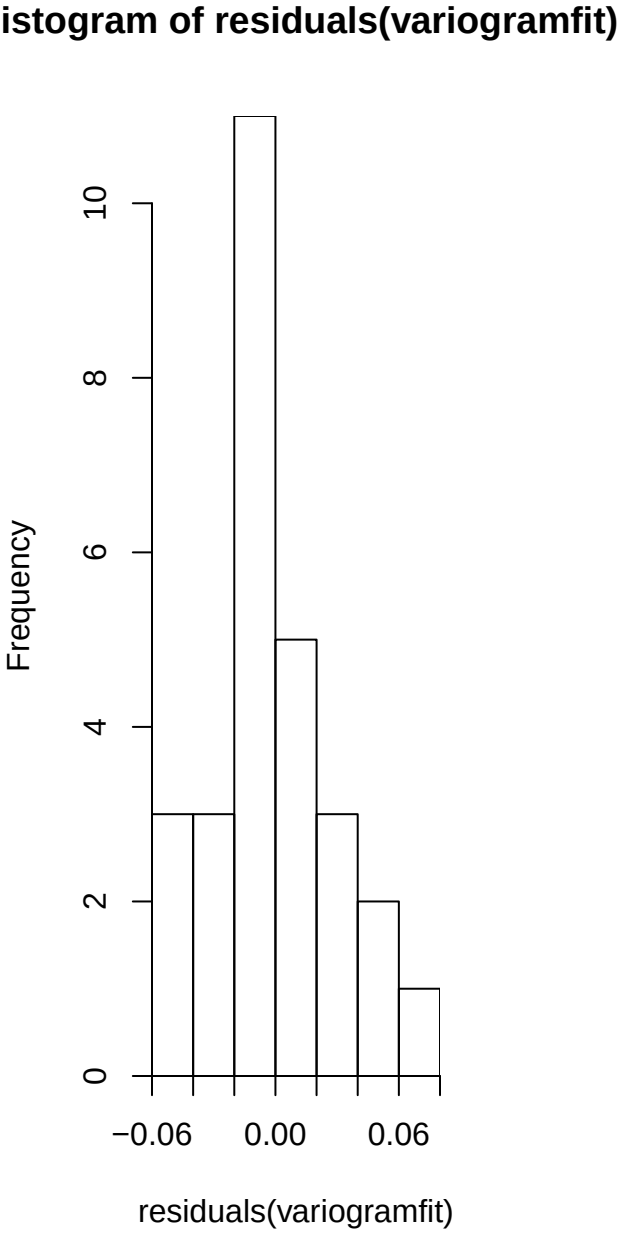

T(s) = 167.3 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.05
0.10
0.15
0.20
0
5
10
20
Lag l

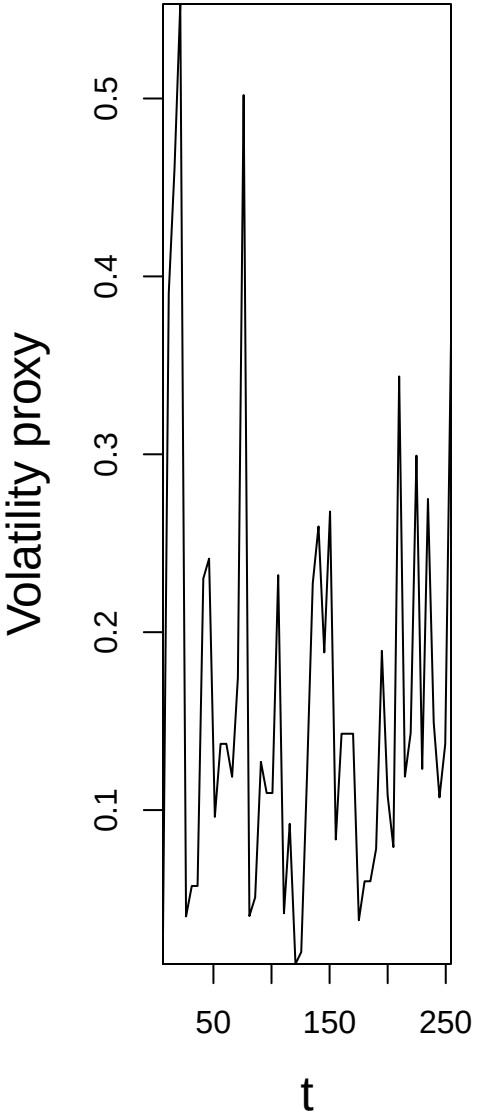

Histogram of residuals(variogramfit)
Frequency
0
1
2
3
4
5
6
7
−0.05
0.05
0.10
residuals(variogramfit)

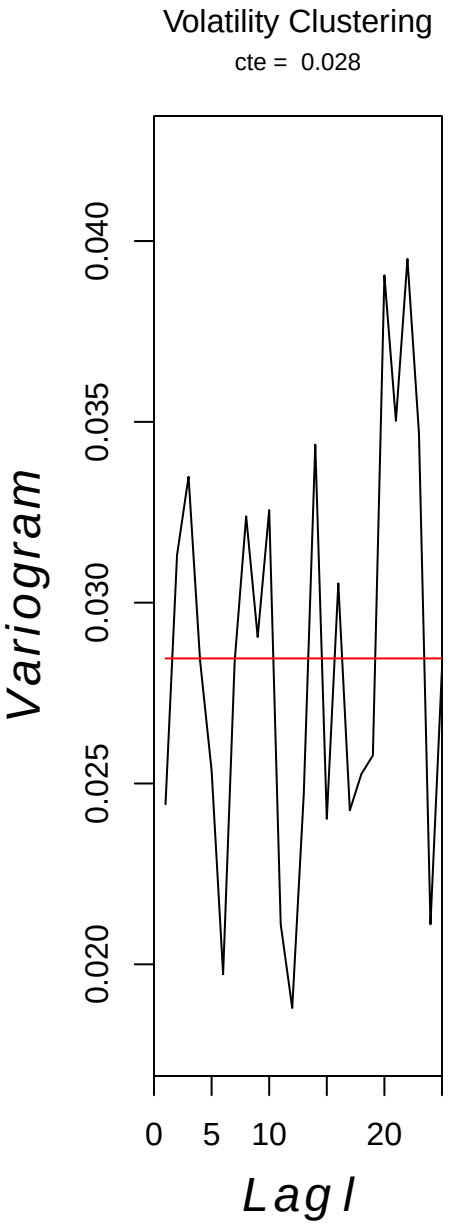

alfa = 0.708 sigma^2 = 0.036
Variogram
0.05
0.10
0.15
0.20
0
5
15
25
Lag l

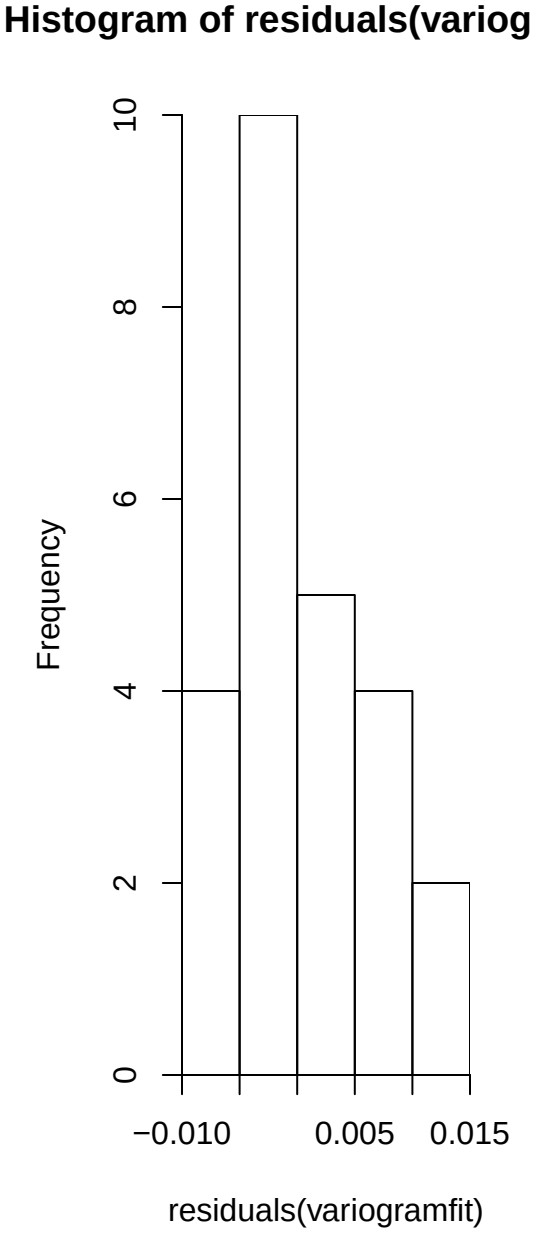

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
−0.06
0.00
0.06
residuals(variogramfit)

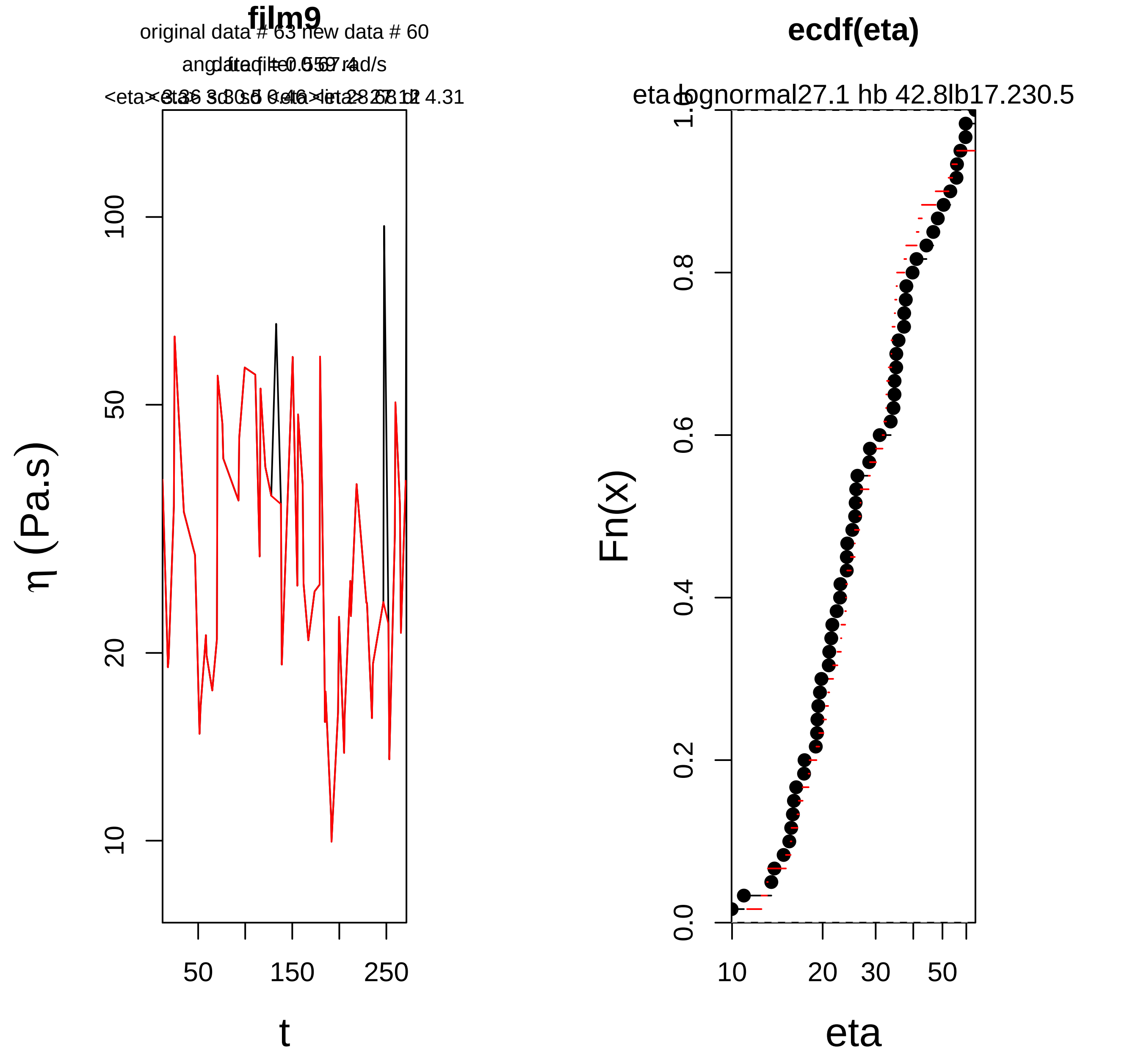

tau = 14.175sigma^2 = 0.05
Variogram
0.05
0.10
0.15
0.20
0
5
15
25
Lag l

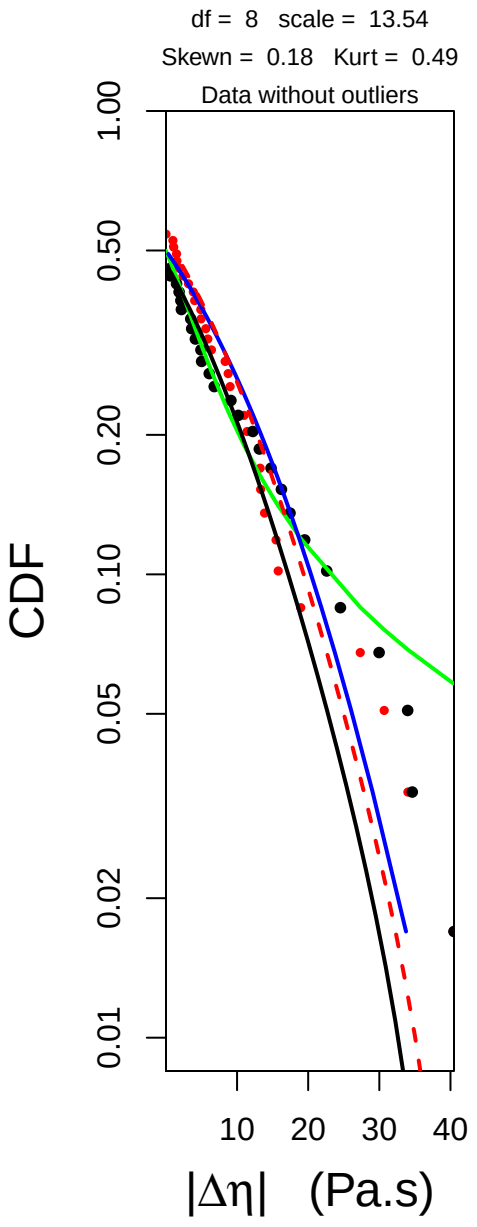

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
−0.06
0.00
0.06
residuals(variogramfit)

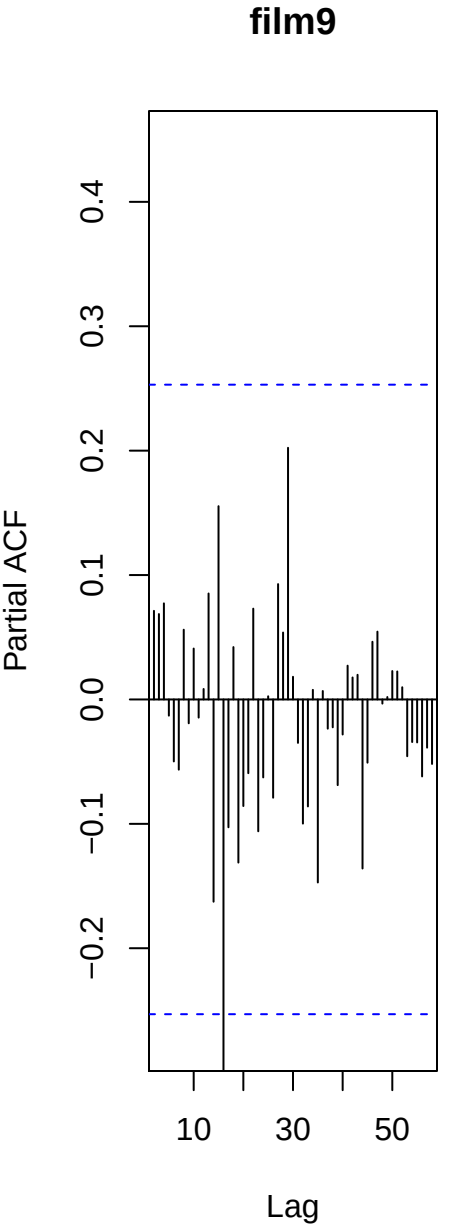

Volatility proxy
0.1
0.2
0.3
0.4
0.5
50
150
250
t

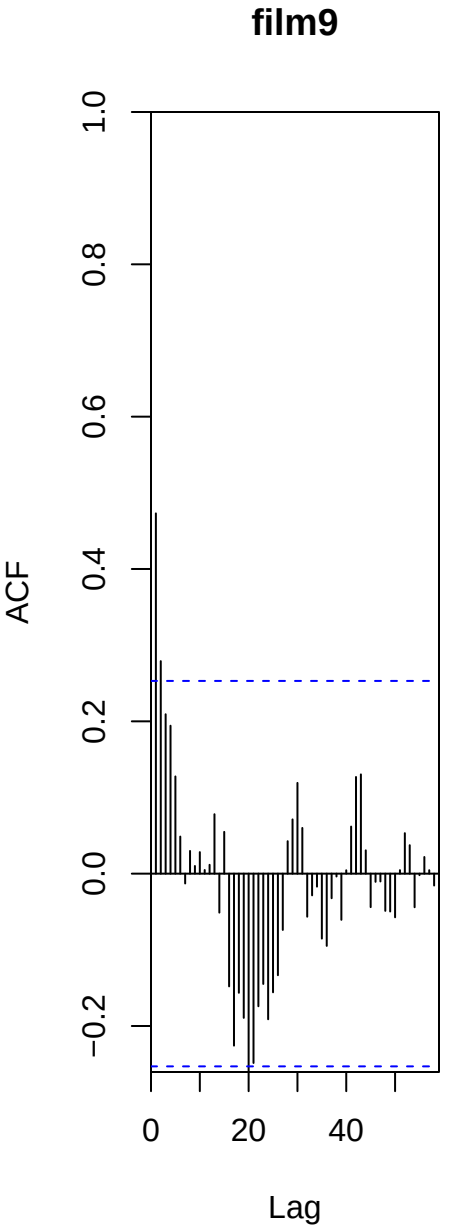

Volatility Clustering
cte = 0.028
Variogram
0.020
0.025
0.030
0.035
0.040
0
5
10
20
Lag l

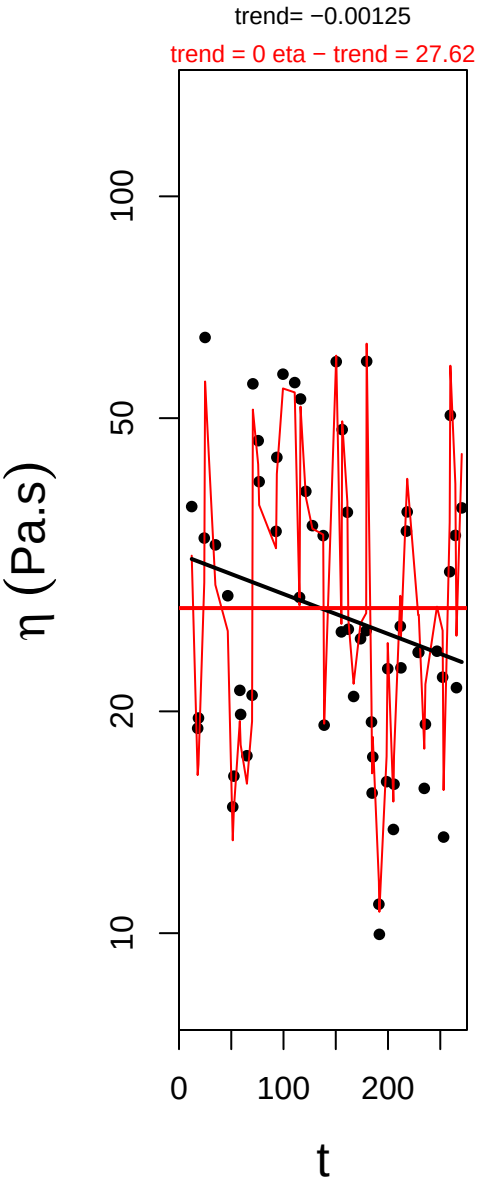

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
−0.010
0.005
0.015
residuals(variogramfit)

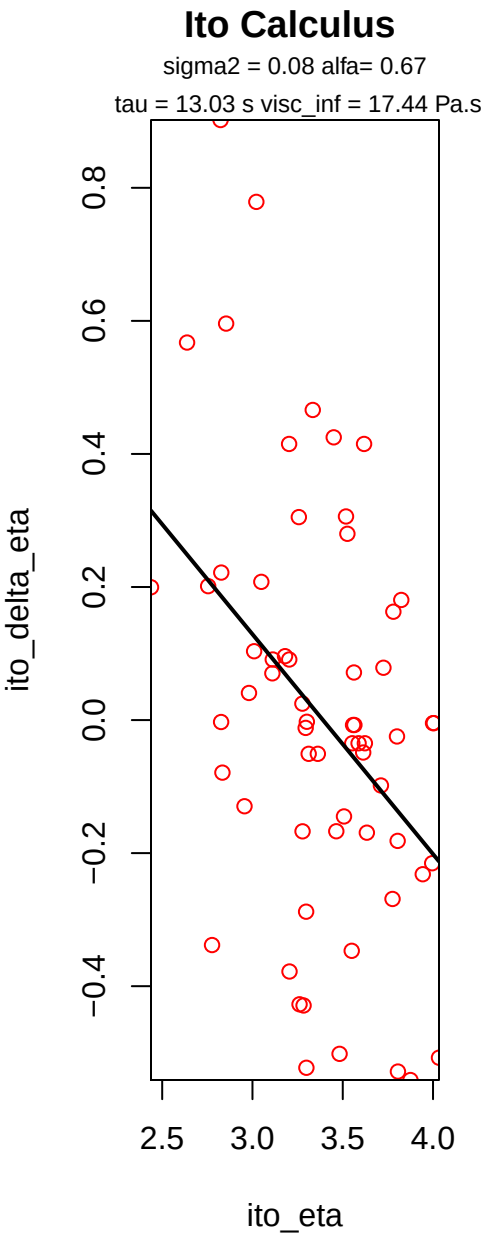

film9
original data # 63 new data # 60
ecdf(eta)
100
50
20
10
η (Pa.s)
50
150
250
t
Fn(x)
0.0
0.2
0.4
0.6
0.8
10
20
30
50
eta

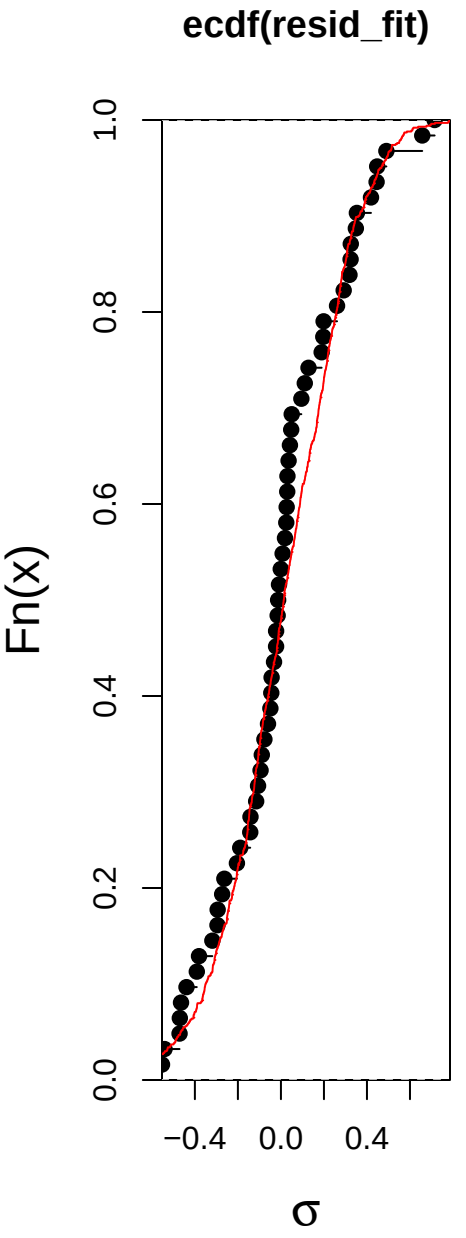

df = 8 scale = 13.54
Skewn = 0.18 Kurt = 0.49
Data without outliers
CDF
1.00
0.50
0.20
0.10
0.05
0.02
0.01
10
20
30
40
|Δη| (Pa.s)

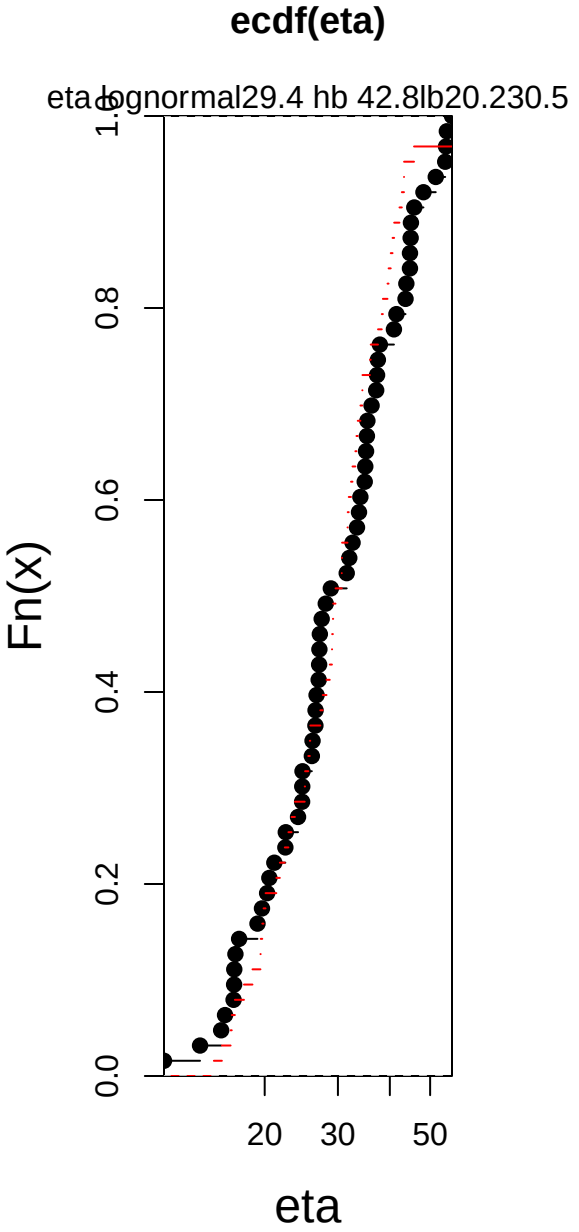

film9
Partial ACF
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
10
30
50
Lag

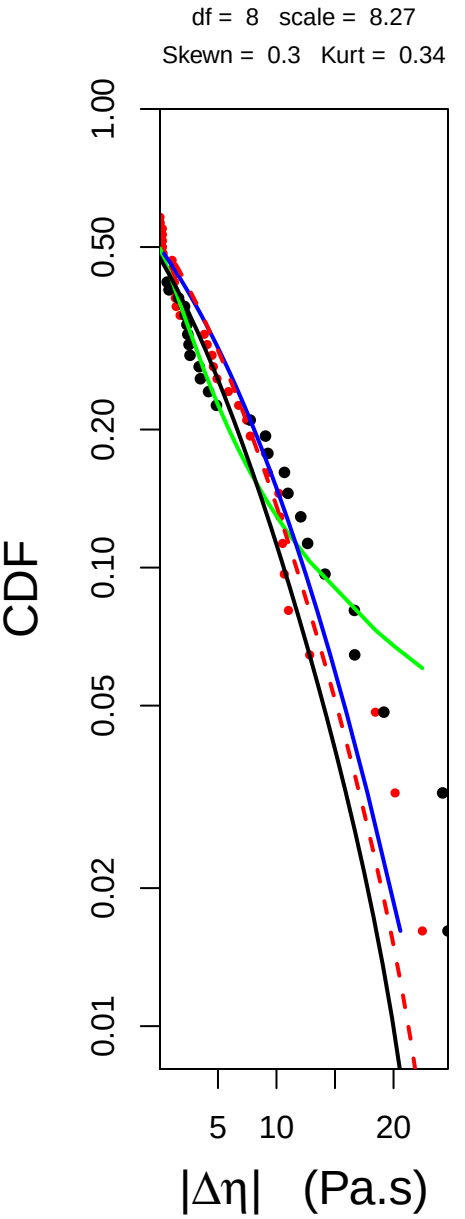

film9
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
20
40
Lag


trend= −0.00125
trend = 0 eta − trend = 27.62
η (Pa.s)
100
50
20
10
0
100
200
t

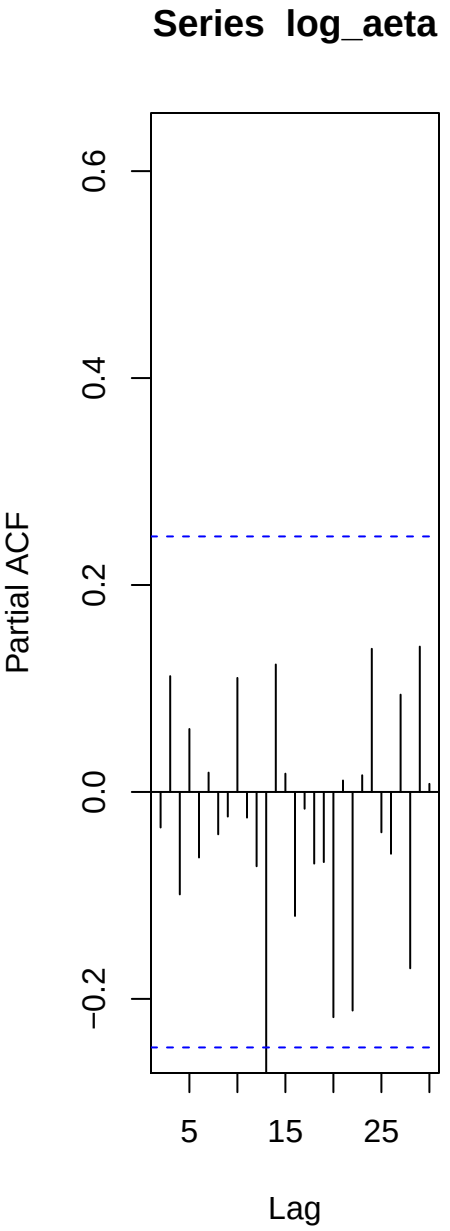

Ito Calculus
sigma2 = 0.08 alfa= 0.67
tau = 13.03 s visc_inf = 17.44 Pa.s
ito_delta_eta
ito_eta
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
2.5
3.0
3.5
4.0

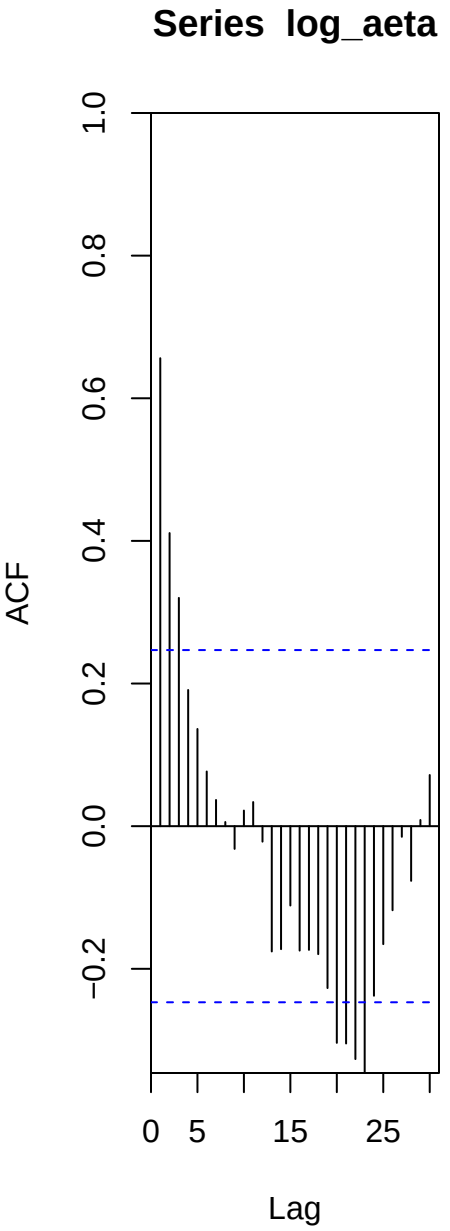

ecdf(resid_fit)
Fn(x)
σ
1.0
0.8
0.6
0.4
0.2
0.0
−0.4
0.0
0.4

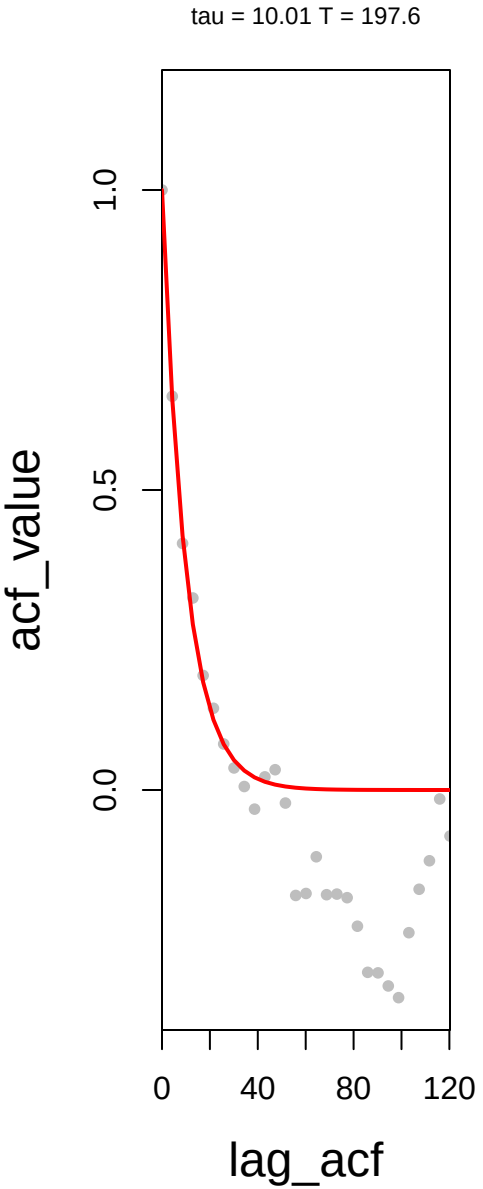


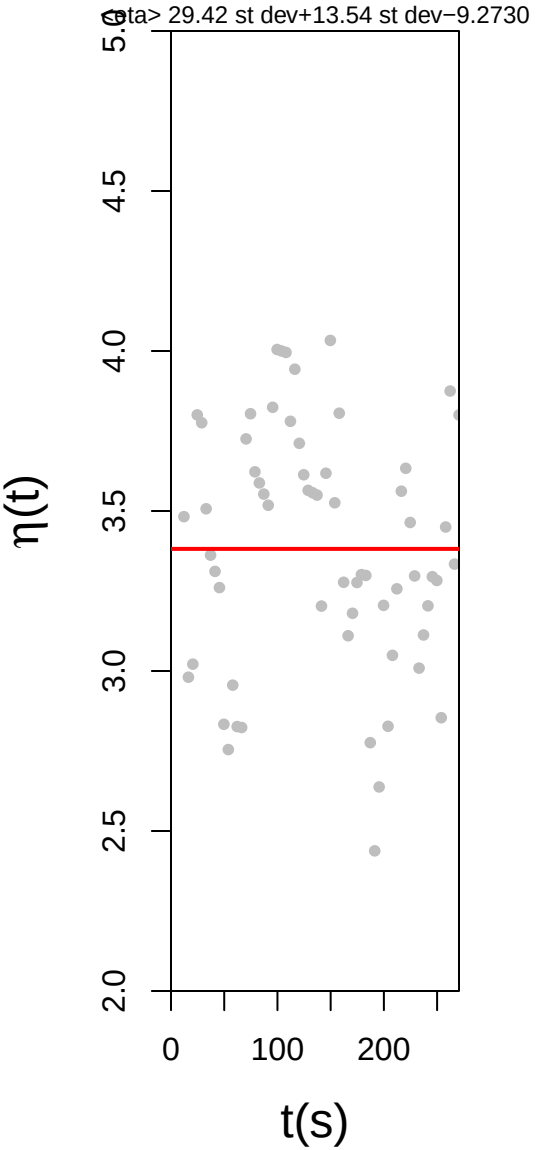


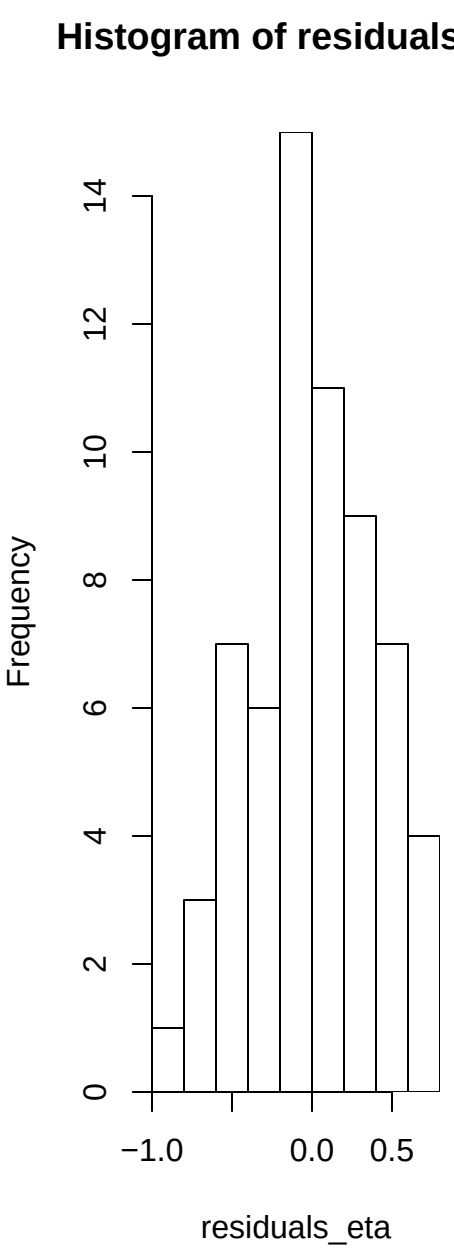
riginal data #

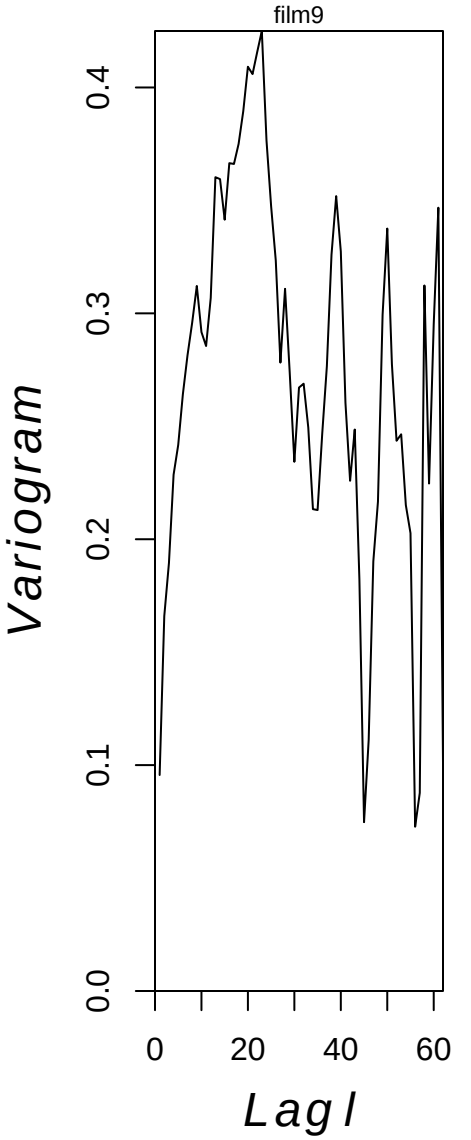

Series log_aeta
Partial ACF
0.6
0.4
0.2
0.0
−0.2
5
15
25
Lag

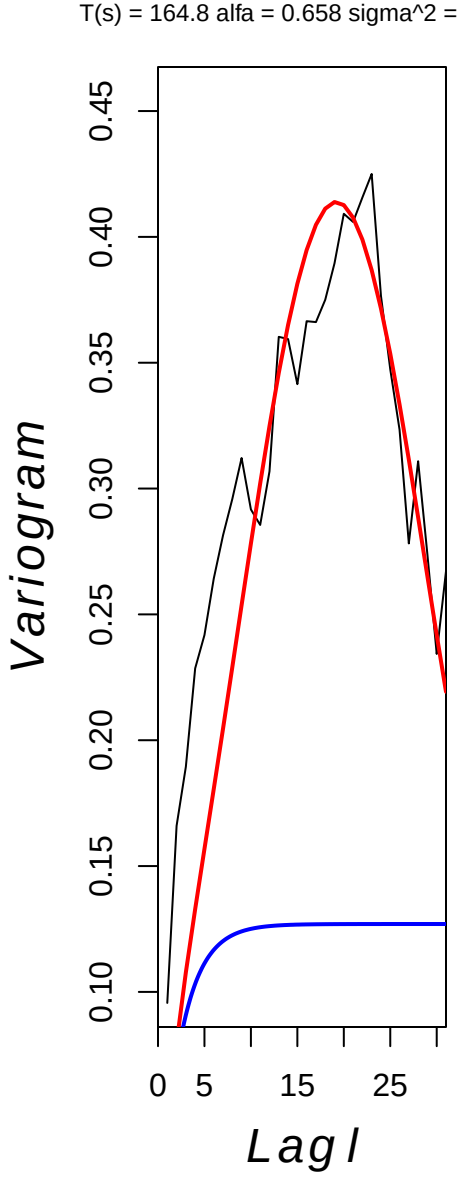

Series log_aeta
ACF
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
5
15
25
Lag

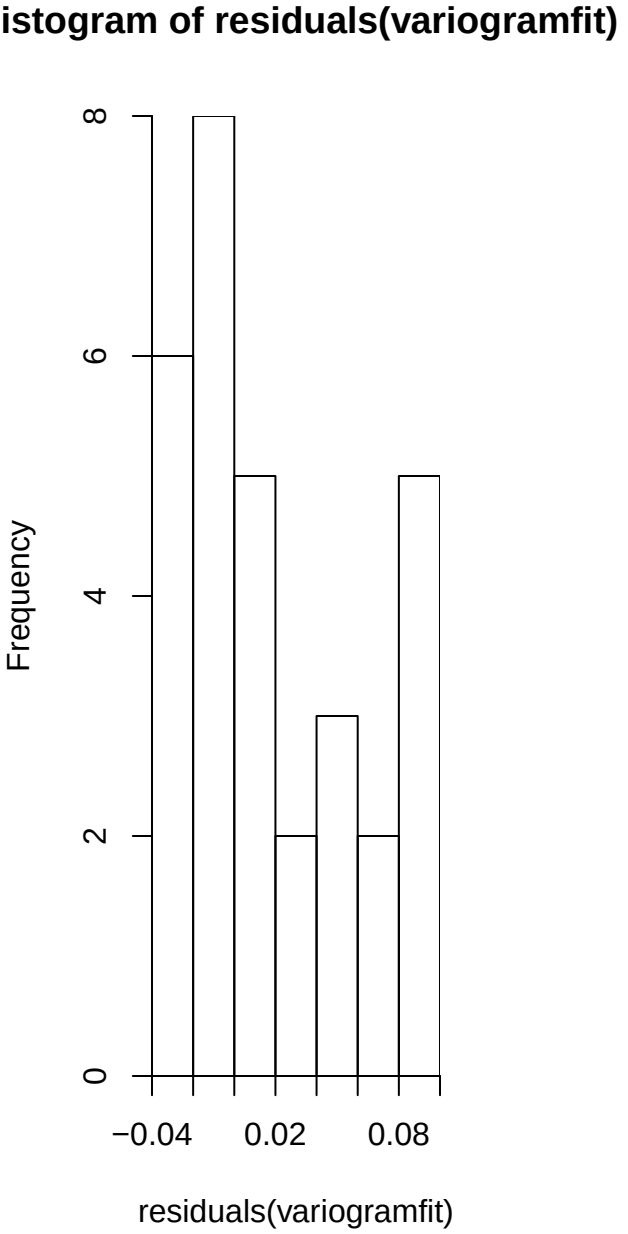

tau = 10.01 T = 197.6
acf_value
0.0
0.5
1.0
0
40
80
120
lag_acf

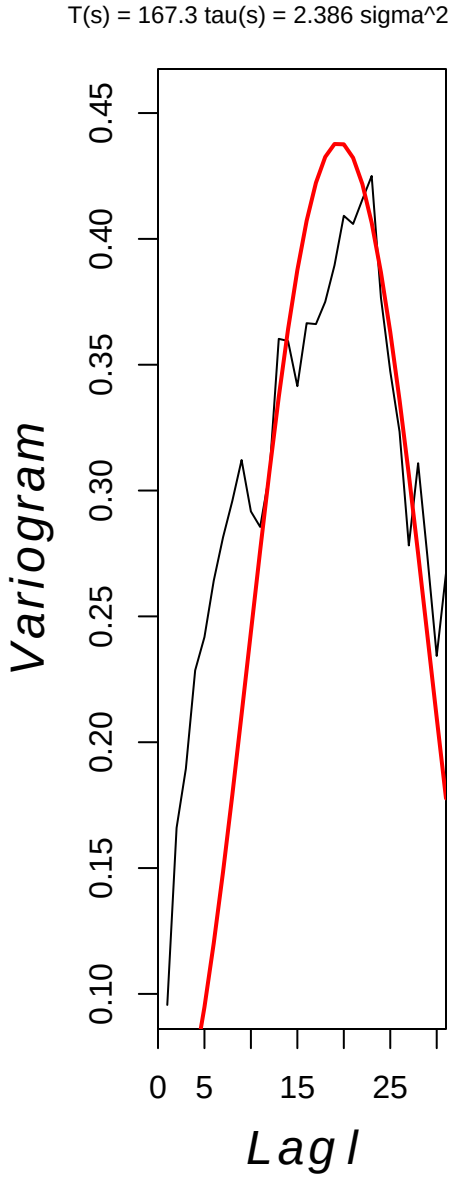

<eta> 29.42 st dev+13.54 st dev−9.2730
η(t)
2.0
2.5
3.0
3.5
4.0
4.5
5.0
0
100
200
t(s)

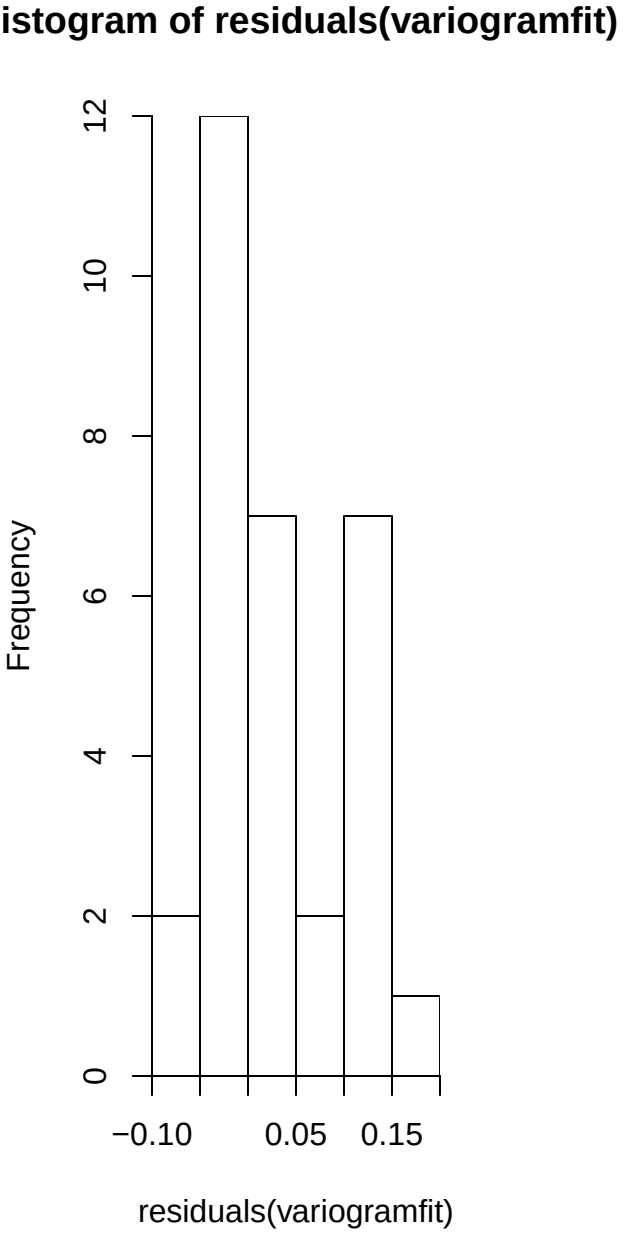

Histogram of residuals_eta
Frequency
0
2
4
6
8
10
12
14
−1.0
0.0
0.5
residuals_eta

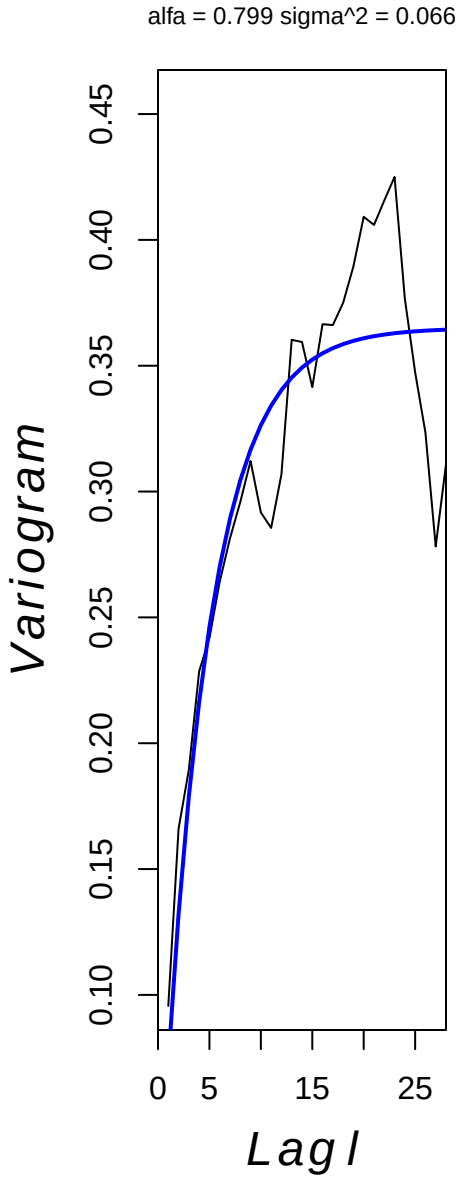

film9
Variogram
0.0
0.1
0.2
0.3
0.4
0
20
40
60
Lag l

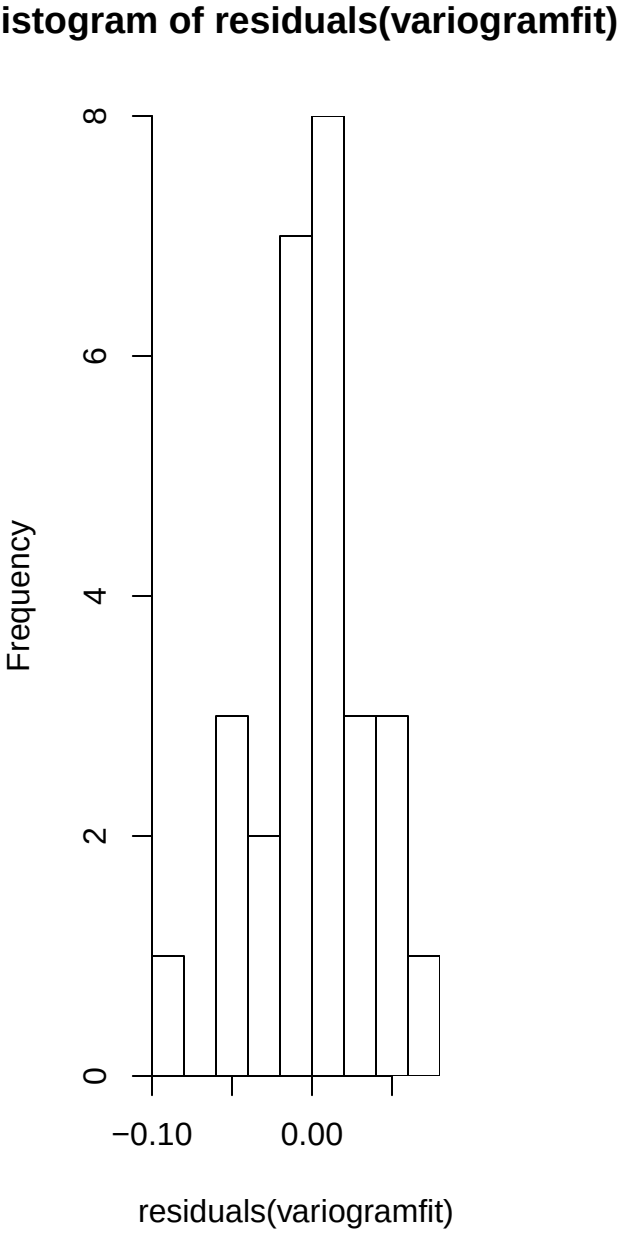

T(s) = 164.8 alfa = 0.658 sigma^2 = 0.036
Variogram
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0
5
15
25
Lag l

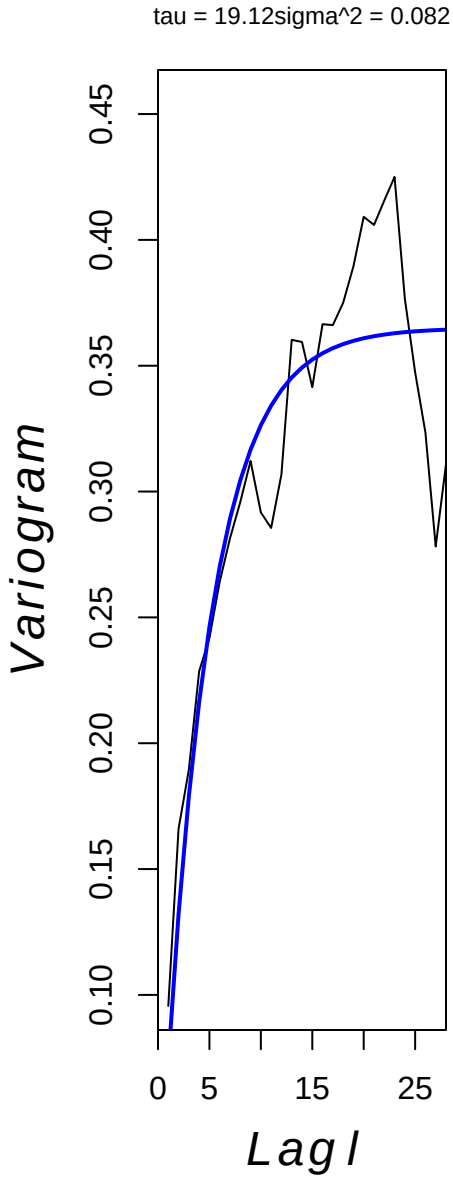

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
−0.04
0.02
0.08
residuals(variogramfit)

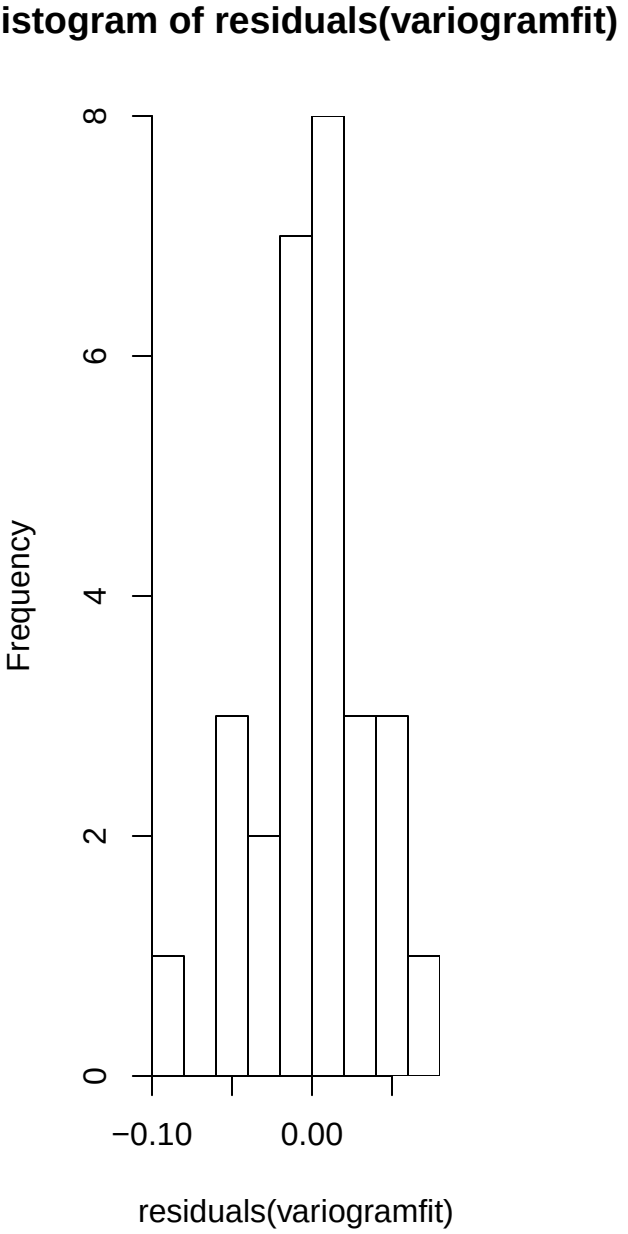

T(s) = 167.3 tau(s) = 2.386 sigma^2 = 0.058
Variogram
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0
5
15
25
Lag l

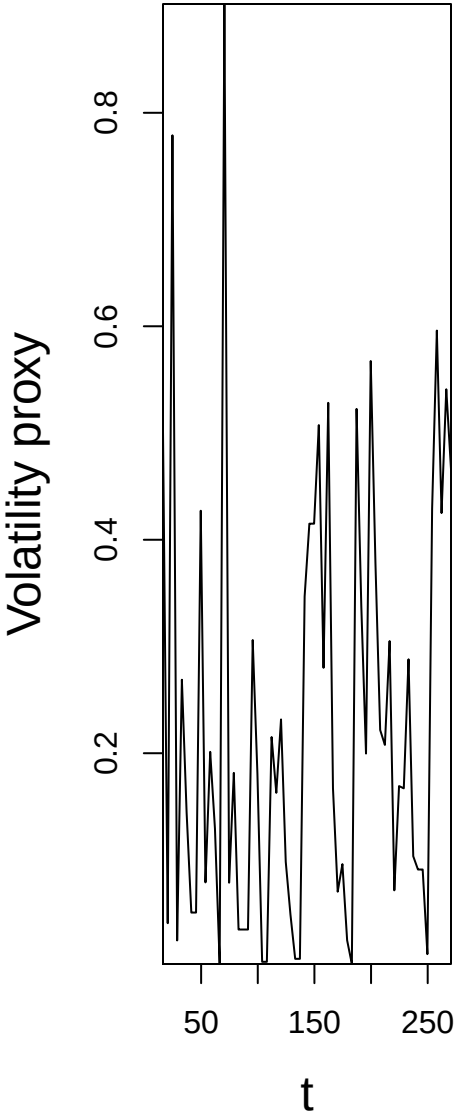

Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
12
−0.10
0.05
0.15
residuals(variogramfit)

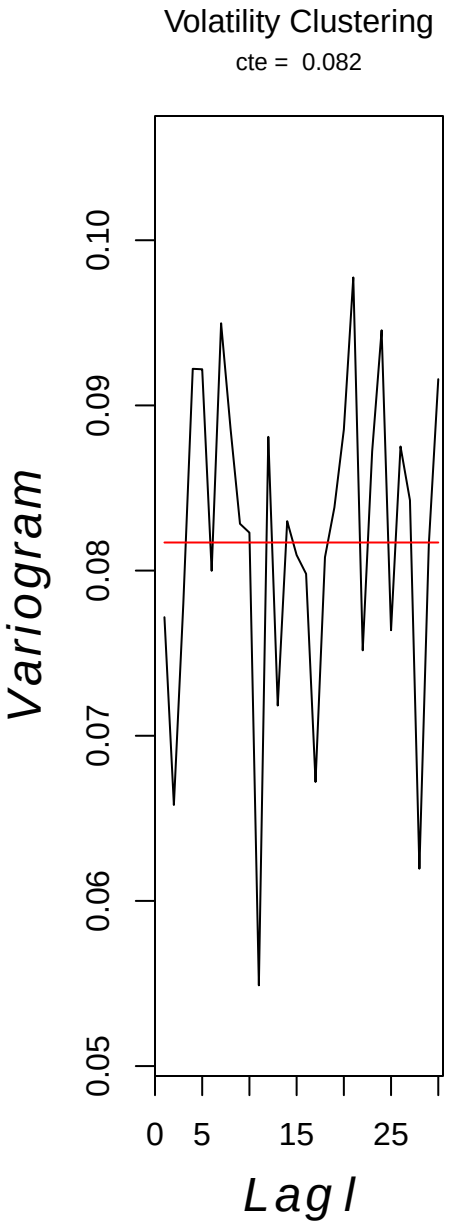

alfa = 0.799 sigma^2 = 0.066
Variogram
Lag l
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0
5
15
25

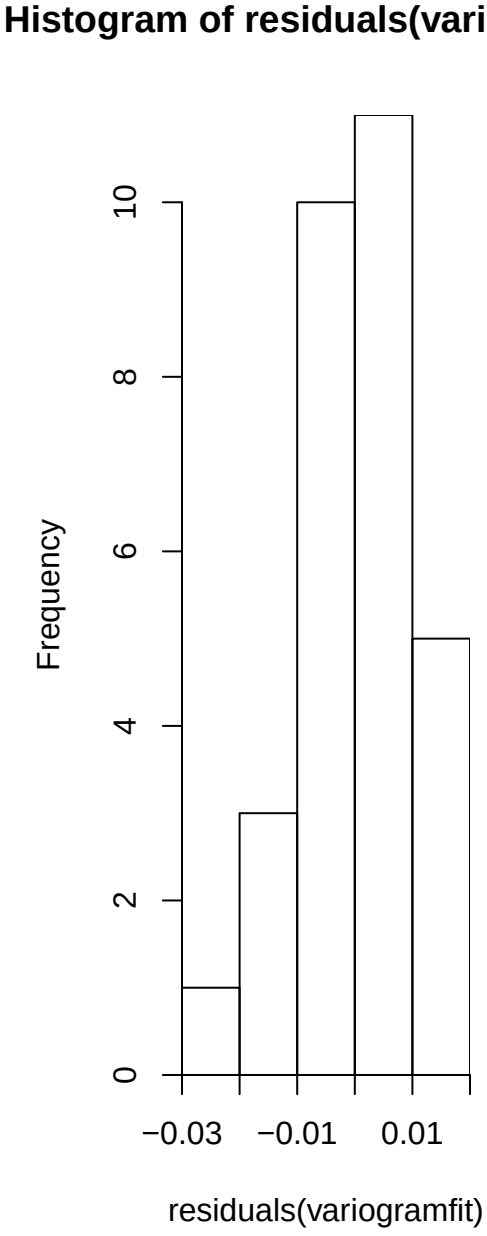

Histogram of residuals(variogramfit)
Frequency
residuals(variogramfit)
0
2
4
6
8
−0.10
0.00


tau = 19.12sigma^2 = 0.082
Variogram
Lag l
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0
5
15
25


Histogram of residuals(variogramfit)
Frequency
residuals(variogramfit)
0
2
4
6
8
−0.10
0.00


Volatility proxy
0.2
0.4
0.6
0.8
50
150
250
t


Volatility Clustering
cte = 0.082
Variogram
0.05
0.06
0.07
0.08
0.09
0.10
0
5
15
25
Lag l


Histogram of residuals(variogramfit)
Frequency
0
2
4
6
8
10
−0.03
−0.01
0.01
residuals(variogramfit)