

Natural Mortality

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`library(ggplot2)`

Introduction

Lorenzen

$$M_W = 0.3W^{0.288}$$

$$N_t = N_0 e^{-M_{t_r} t}$$

$$M_{t_r} = \frac{1}{T} \sum_{t=t_r}^{T-1} M(W_t)$$

```
mass=c(1.90,4.23,7.47,11.48,16.04,20.96,26.07,31.22,36.28,41.17,45.83,50.20,54.27,58.03,61.48,64.62)
```

```
len =(mass/2.6935e-5)^(1/2.857)
```

```
mass =2.6935e-5*(len^2.857)
```

```
test=data.frame(
  age      =1:16,
  len      =len,
  mass     =mass,
  hoenig   =0.27725,
  jensen   =c(0.33,rep(0.195,15)),
  rickterE=0.32,
  lorenzen=c(0.25,0.20,0.17,0.15,0.13,0.12,0.12,0.11,0.11,0.10,0.10,0.10,0.09,0.09,0.09,0.09),
  peterW   =c(0.16,0.13,0.12,0.10,0.10,0.09,0.08,0.08,0.08,0.08,0.07,0.07,0.07,0.07,0.07,0.07),
  mcgurk=c(0.41,0.31,0.25,0.21,0.19,0.17,0.16,0.15,0.14,0.13,0.13,0.12,0.12,0.12,0.11,0.11),
  chenW    =c(0.43,0.34,0.28,0.25,0.22,0.20,0.19,0.18,0.17,0.17,0.18,0.20,0.22,0.24,0.25,0.26))
```

```
rm(mass,len)
```

```
source('~/Desktop/flr/git/lh/R/lh-m-lorenzen.R')
```

```
ggplot(transform(test,l.=lorenzen(test$mass)))+
  geom_point(aes(age,lorenzen))+
  geom_line(aes(age,l.))
```