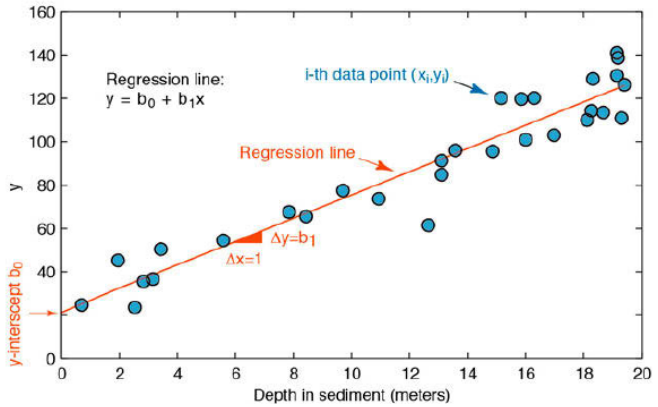
Q1: polyfit




```
clear

agedepth = load('agedepth_1.txt');

meters = agedepth(:,1);
age = agedepth(:,2);
```

```
p = polyfit(meters,age,1)

p =
    5.3667   21.7607
```

```
plot(meters,age,'o'), hold on
plot(meters,p(1)*meters+p(2),'r'), hold off
```

```
plot(meters,age,'o'), hold on
plot(meters,polyval(p,meters),'r'), hold off
```

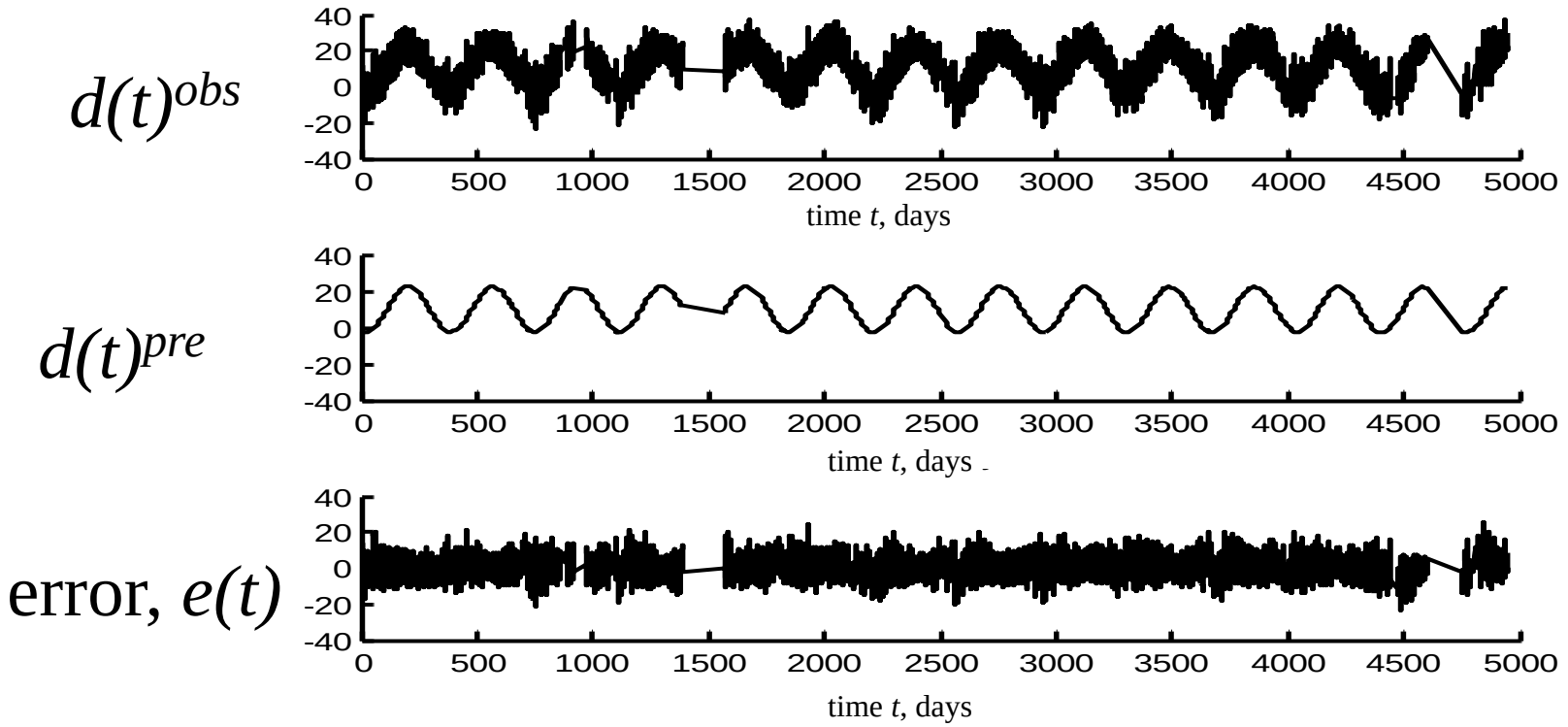
Q2: Least-square regression

$$\mathbf{m}^{est} = [\mathbf{G}^T\mathbf{G}]^{-1}\ \mathbf{G}^T\ \mathbf{d}^{obs}$$

```
M=2;
G=zeros(N,M);
G(:,1)=1;
G(:,2)=x;

mest = (G'*G)\(G'*dobs);
dpre = G*mest;
e=dobs-dpre;
E = e'*e;
```

Q3:modeling long-term trend and annual cycle in Black Rock Forest temperature data



the model:

$$d_i = \underbrace{m_1 + m_2\, t_i}_{\text{long-term trend}} + \underbrace{m_3 \cos\frac{2\pi t_i}{T} + m_4 \sin\frac{2\pi t_i}{T}}_{\text{annual cycle}}$$

MatLab script to create the data kernel

```
Ty=365.25;
G=zeros(N,4);
G(:,1)=1;
G(:,2)=t;
G(:,3)=cos(2*pi*t/Ty);
G(:,4)=sin(2*pi*t/Ty);
```