Assignment #8

a)

$$\tau_1 = \left\{(-1,-1.1),(-0.5,-0.02\bar{5}),(1,1)\right\}$$

$$\tau_2 = \left\{(-0.5,-0.02\bar{5}),(0.5,0.32\bar{5}),(1,1)\right\}$$

$$\tau_3 = \left\{(0.1,0.001),(0.5,0.02\bar{5}),(1,1.1)\right\}$$

$$\tau_4 = \left\{(-0.1,-0.101),(-0.5,-0.125),(-1,-0.8)\right\}$$

b)

Obtaining models using a computer

$$f_{\tau_1}(x) = \underbrace{0.9654}_{\beta_1^1}x + \underbrace{0.1192}_{\beta_0^1} \qquad f_{\tau_3}(x) = 1.259x - 0.2962$$

$$f_{\tau_2}(x) = 0.6357x + 0.2214 \qquad f_{\tau_4}(x) = 0.8002x + 0.08475$$

$$\mathbb{E}_{\tau}\left(f_{\tau}(x_0) - \underbrace{f_{exact}(x_0)}_{\substack{0 \text{ because} \\ f_{exact}(0)=0}}\right) = \mathbb{E}_{\tau}\left(f_{\tau}(0)\right) = \frac{1}{4}\sum_{i=1}^{4}\beta_0^i = 0.03229$$

c)

$$Var_{\tau}\left(f_{\tau}(0)\right) = \frac{1}{3}\sum_{i=1}^{4}\left(\beta_0^{(i)} - \underbrace{\mathbb{E}_{\tau}(f_{\tau}(x_0))}_{\text{Already Computed}}\right)^2 = 0.05134$$

Comparison.