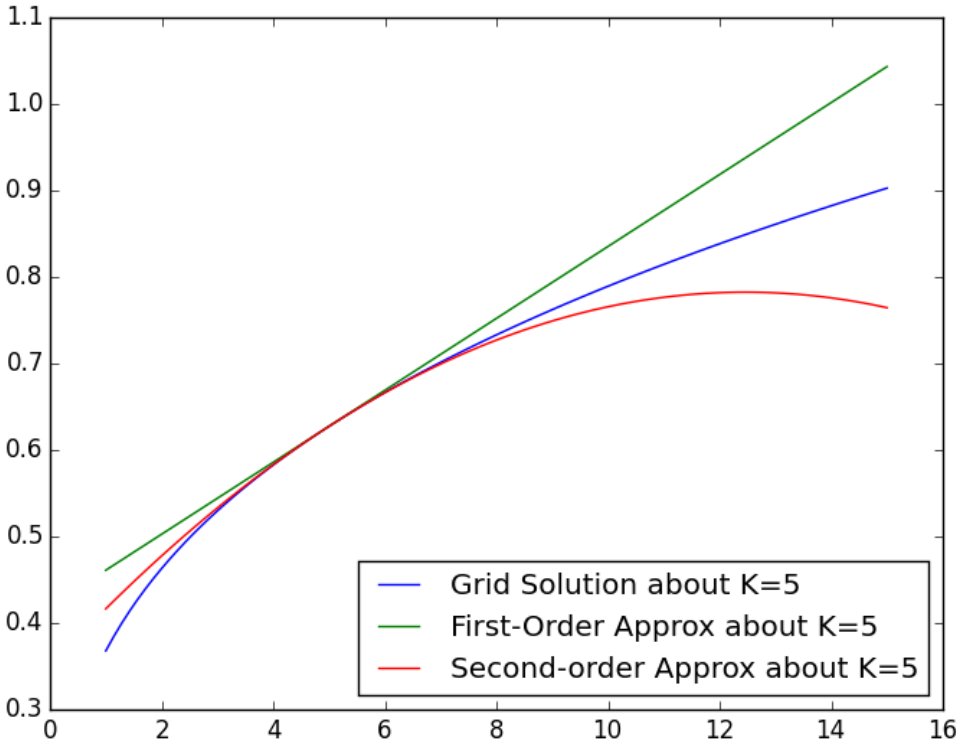
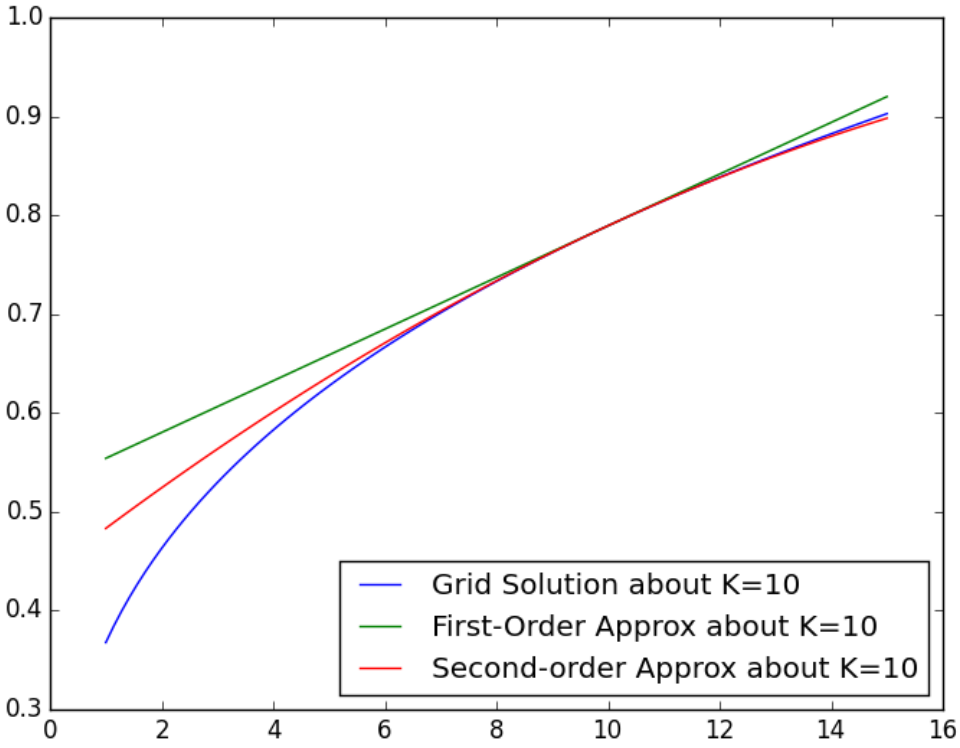
9.2

At $k = 5$, $w = 0.62736178$
At $k = 5$, $\frac{dw}{dk} = 0.04158578$
At $k = 5$: $\frac{d^2w}{dk^2} = -0.00557443$
Grid solution:

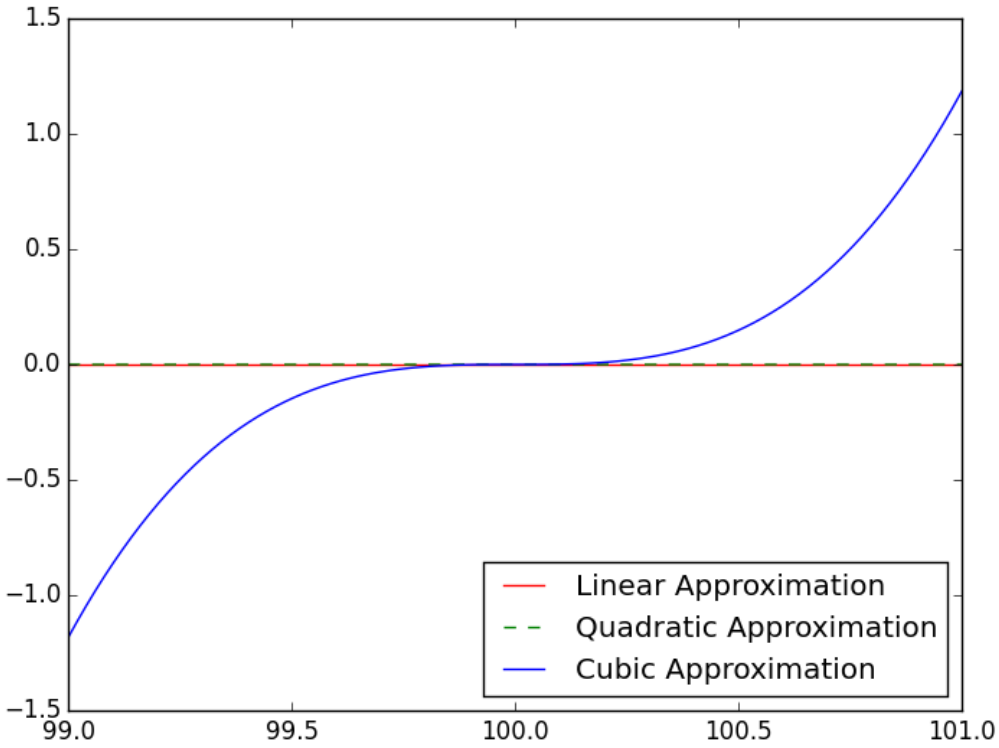


At $k = 10$, $w = 0.78930333$
At $k = 10$, $\frac{dw}{dk} = 0.02613712$
At $k = 10$: $\frac{d^2w}{dk^2} = -0.00174971$
Grid solution:



9.3

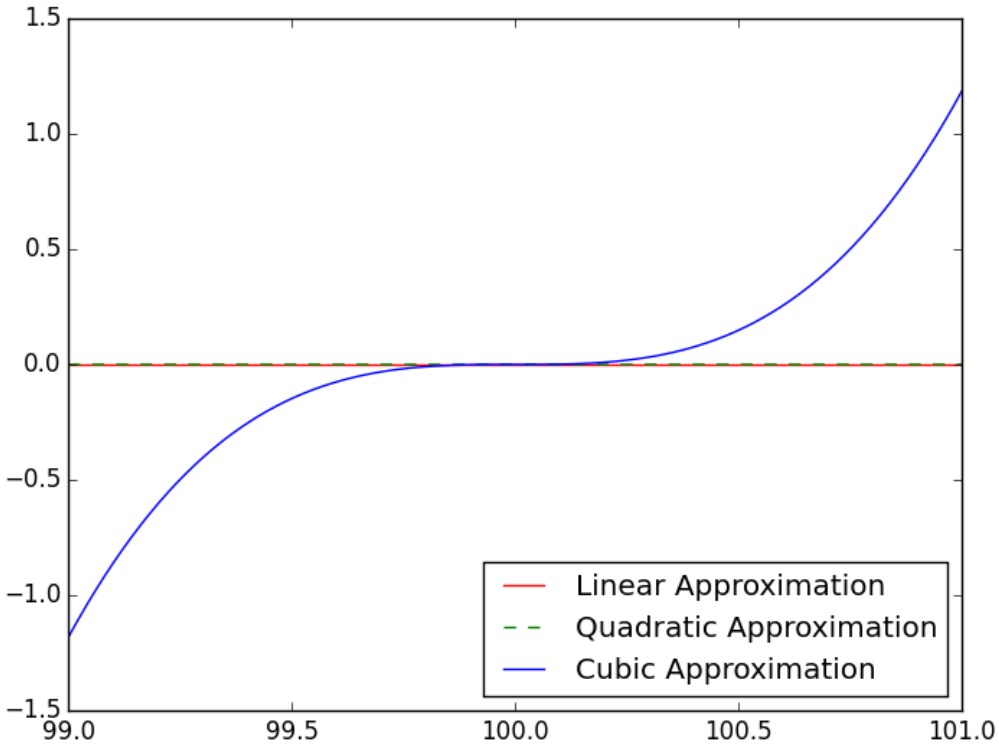
$y = 47.46578754$
$y + \epsilon = 47.46579225$
$y - \epsilon = 47.46578282$
$y + 2\epsilon = 47.465796964$
$y - 2\epsilon = 47.46577811$
$Firstderivative = 0.47108525$
$Seconderivative = 0$
$ThirdDerivative = -10.65814104$

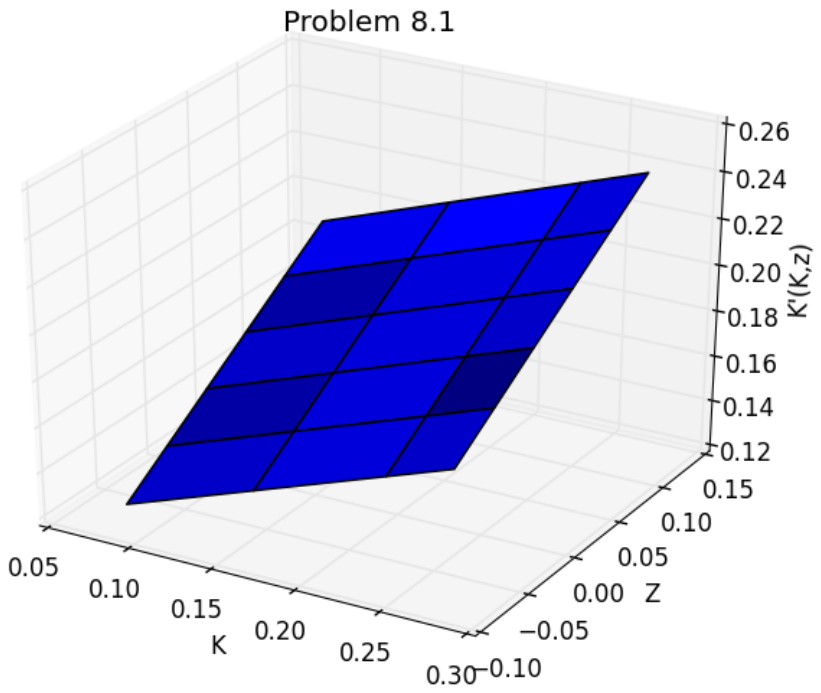


9.4

$$H^k(X_{t-1}, Z_t, v) = H^k(\bar{X}, \bar{Z}, 0) + \begin{bmatrix} -.0098 & .119 \end{bmatrix} \begin{bmatrix} \tilde{X}_{t-1} \\ \tilde{Z}_t \end{bmatrix}$$

$$+\frac{1}{2} \begin{bmatrix} \tilde{X}_{t-1}^T & \tilde{Z}_t^T & v \end{bmatrix} \begin{bmatrix} -.0022 & .0956 & 0 \\ .0956 & -.119 & 0 \\ 0 & 0 & .3202 \end{bmatrix} \begin{bmatrix} \tilde{X}_{t-1} \\ \tilde{Z}_t \\ v \end{bmatrix}$$


1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
99.0
99.5
100.0
100.5
101.0
Linear Approximation
Quadratic Approximation
Cubic Approximation



This graph is very similar to other models' graphs.