pkjun16 question 2.1. memo (from ST 2 2017)

$$m(k+1) = e(k+1) - 0.9e(k) + 0.98m(k)$$

$$M(z)\cdot z = E(z)(z) - 0.9E(z) + 0.98M(z)$$

$$M(z)[z-0.98] = E(z)[z-0.9].$$

$$\frac{M(z)}{E(z)} = \frac{z-0.9}{z-0.98}$$

$$G(z) = \mathcal{Z}\left[\frac{5(1-e^{-5T})}{5}\cdot\frac{5}{s(s+2)}\right].$$

$$= 25\cdot\frac{z-1}{z}\cdot\mathcal{Z}\left[\frac{1}{s^2(s+2)}\right]. \quad \text{let } T=0.1$$

$$= \frac{25}{2}\cdot\left[\frac{z-1}{z}\right]\cdot\mathcal{Z}\left[\frac{2}{s^2(s+2)}\right]. \quad \begin{matrix} a=2 \\ T=0.1 \end{matrix}$$

$$= 12.5\left[\frac{z-1}{z}\right]\cdot\left[\frac{z[(0.2-1+e^{-0.2})z+(1-e^{-0.2}-0.2e^{-0.2})]}{2(z-1)^2(z-e^{-0.2})}\right].$$

$$= 12.5\left[z-1\right]\cdot\frac{0.01872z+0.0175}{2(z-1)^2(z-0.8187)}.$$

$$= 12.5\left[\frac{0.01872z+0.0175}{2(z-1)(z-0.8187}\right].$$

$$G(z) = \frac{(12.5)(0.0187)}{2}\left[\frac{z+0.936}{(z-1)(z-0.8187}\right].$$

$$\frac{O(z)}{E(z)} = D(z)\cdot G(z)$$

$$= \left[\frac{z-0.9}{z-0.98}\right](0.116875)\left[\frac{z+0.936}{(z-1)(z-0.8187)}\right].$$

$$\frac{a}{s^2(s+a)} \quad \frac{z[(aT-1+e^{-aT})z+(1-e^{-aT}-aTe^{-aT})]}{a(z-1)^2(z-e^{-aT})}$$