

Examples 4

Q:

Solution $G_{ZOH} = \frac{1 - e^{-sT}}{s}$ $G(s) = \frac{1}{s+1}$

$$G_{ZAS}(z) = z \left\{ \left[\frac{1 - e^{-sT}}{s} \cdot \frac{1}{s+1} \right] \right\}$$

$$= (1 - z^{-1}) z \left\{ \left[\frac{1}{s(s+1)} \right] \right\}$$

$$\because z = e^{sT} \quad \therefore z^{-1} = e^{-sT} \quad \therefore (1 - e^{-sT}) = (1 - z^{-1})$$

$$G_{ZAS}(z) = \frac{(1 - z^{-1})(1 - e^{-T})z^{-1}}{(1 - z^{-1})(1 - e^{-T}z^{-1})}$$

$$= \frac{1 - e^{-T}}{z - e^{-T}}$$

$$= \frac{0.09516}{z - 0.9048} \quad \text{when } T = 0.1$$

$$T = 0.1 \quad z = \frac{1 + \frac{wT}{2}}{1 - \frac{wT}{2}} = \frac{1 + 0.05w}{1 - 0.05w}$$

$$G_1(w) = \frac{0.09516}{\frac{1 + 0.05w}{1 - 0.05w} - 0.9048}$$

$$= \frac{0.09516}{\frac{1 + 0.05w - 0.9048(1 - 0.05w)}{1 - 0.05w}}$$

$$= \frac{-0.65\omega + 1}{1.05\omega + 1}$$

ppt 直接四舍五入为 1 了

$$T = 0.01$$

$$G_{ZAS}(z) = \frac{1 - e^{-T}}{z - e^{-T}} = \frac{0.00995}{z - 0.99}$$

$$G_2(\omega) = \frac{-0.085\omega + 1}{\omega + 1}$$