$\omega_c = 2\pi F_c = 2\times\pi\times 1000 = 2000\pi$ 6283.185

$\omega_s = 2\pi F_s = 2\times\pi\times 350 = 700\pi$ 2199.1149

$T = \frac{1}{f} = \frac{1}{5000} = 0.2ms$

$\Omega_p = \frac{2}{T}\tan\frac{\omega_p T}{2} = \frac{2}{0.2m}\tan\left(\frac{2000\pi\times 0.2\times 10^{-3}}{2}\right)$ $10000\tan(0.628318)$

$= 7265.4$ rad/sec

$\Omega_s = \frac{2}{1}\tan\frac{\omega_s T}{2} = \frac{2}{0.2m}\tan\left(\frac{700\pi\times 0.2m}{2}\right) = 2235.3$ rad/sec

$$N = \frac{\log\sqrt{\frac{10^{0.1\alpha_s}-1}{10^{0.1\alpha_p}-1}}}{\log\frac{\Omega_s}{\Omega_p}} = \frac{\log\sqrt{\frac{10^{0.1(10)}-1}{10^{0.1(3)}-1}}}{\frac{\log(7265.4)}{\log(2235.3)}} = \frac{0.6471212}{0.5118836} = 0.93208979$$

$\boxed{N\approx 1}$ order

$\Omega_c = 1$ rad/sec is $H(s) = \frac{1}{1+s}$

$\Omega_c = \Omega_p = 7265$ rad/sec $\quad s \to \frac{\Omega_c}{s} \to \frac{7265}{s}$

High pass Tn of ln of high pass s $\quad H(s) = \frac{1}{s+1}\Big|_{s=\frac{7265}{s}} = \frac{1}{\frac{7265}{s}+1} = \frac{s}{s+7}$

Bilinear Transformation

$$H(z) = H(s)\Big|_{s=\frac{2}{T}\left(\frac{1-z^{-1}}{1-z^{-1}}\right)}$$

$$H(z) = \left. \frac{s}{s+7265} \right|_{s=\frac{2}{0.2m}\left(\frac{1-z^{-1}}{1+z^{-1}}\right)}$$

$$= \frac{10^4\left(\frac{1-z^{-1}}{1+z^{-1}}\right)}{10^4\left(\frac{1-z^{-1}}{1+z^{-1}}\right) + 7265}$$

$$= \frac{10^4(1-z^{-1})}{10^4(1-z^{-1}) + 7265(1+z^{-1})}$$

$$= \frac{10^4(1-z^{-1})}{10^4 - 10^4 z^{-1} + 7265 + 7265 z^{-1}}$$

$$= \frac{10^4(1-z^{-1})}{17265 - 2735 z^{-1}}$$

$$= \frac{10^4(1-z^{-1})}{17265\left(1 - 0.15841292\, z^{-1}\right)}$$

$$= \frac{0.5792665(1-z^{-1})}{1 - 0.1584129\, z^{-1}}$$