BESSEL FILTER EXAMPLE

For $n = 2$, $E(s) = s^2 + a_1 s + a_0$. Choose $T = 1$. Then, from eq. (12-132), the delay is

$$T_G(s) = \frac{a_1(-s^2 + a_0)}{s^4 + (2a_0 - a_1^2)s^2 + a_0^2}$$

and the delay error is

$$\Delta T_G(s) = 1 - T_G(s) = \frac{s^4 + (2a_0 - a_1^2 + a_1)s^2 + (a_0^2 - a_0 a_1)}{s^4 + (2a_0 - a_1^2)s^2 + a_0^2}$$

Hence, for maximally flat error, $a_0 = a_1 = 3$, and

$$T_G(s) = 1 - \frac{s^4}{s^4 - 3s^2 + 9} \rightarrow 1 - \frac{\omega^4}{s^4 - 3s^2 + 9}$$