

5.1 Approximation with FOPDT/SOPDT

FOPDT model: $W_m(s) = \frac{K}{1 + T_o \cdot s} e^{-\tau s}$ where $s = j\omega$

SOPDT model: $W_m(s) = \frac{K}{(1 + T_1 \cdot s)(1 + T_2 \cdot s)} e^{-\tau s},$

Simplify next transfer functions:

1. $W_1 = \frac{13.7}{(1 + 120s)(1 + 36s)}$

2. $W_2 = \frac{K}{(1 + 120s)(1 + 36s)(1 + 14s)(1 + 10s)}$

3. $W_3 = \frac{13.7}{(1 + 120s)(1 + 36s)} e^{-18s}$

4. $W_4 = \frac{13.7(1 + 12s)}{(1 + 10s)(1 + 6s)} e^{-s}$

5. $W_5 = \frac{13.7(1 - 12s)}{(1 + 120s)(1 + 36s)} e^{-18s}$

6. $W_6 = \frac{K(1 + 12s)(1 - 4s)}{(1 + 120s)(1 + 36s)(1 + 14s)(1 + 10s)} e^{-9s}$

7. $W_7 = \frac{1 + 10s}{(1 + 12s)(1 + 23s)} e^{-3s}$

Use both General and Skogestad's method