



All upper case variables are Laplace-transformed. All lower case are time variables.

$$v1 = k1 (x_{ref} - x)$$

$$v2 = k2(x_{ref} - x)$$

$$V3/V2 = k_p + k_i/s + k_d s$$

$$X1/V3 = bV3/s(s+a)$$

$$X = bV3 - g/s/(s(s+a))$$