\[ \frac{Y(s)}{X(s)} = \frac{2(s-1)}{(s+2)(s+1)} \]

\[ Y(s) = \frac{2(s-1)}{X(s)(s+2)(s+1)} \]
\[ \frac{1}{s} \]

\[ y(t) = \mathcal{L}^{-1}[Y(s)] = -3e^{-2t} + 4e^{-t} - 1 \]
ECE 382 HW 6 Soln

B- 3 - 29 Define
\[ y = 0.2x^2 = f(x) \quad \text{,} \quad \bar{x} = 2 \]

Then
\[ y = f(t) = f(\bar{x}) + \frac{df}{dx}(x-\bar{x}) + \cdots \]

Since the higher order terms in this equation are small, neglecting these terms, we obtain
\[ y - f(\bar{x}) = \frac{df}{dx}(x-\bar{x}) = 0.6 \bar{x}^2(x-\bar{x}) \bigg|_{\bar{x} = 2} \]
\[ y - 0.2 \times 2^3 = 0.6 \times 2^2(x-2) \]

Thus, linear approximation of the given nonlinear equation near the operating point is
\[ y = 2.4x - 3.2 \]