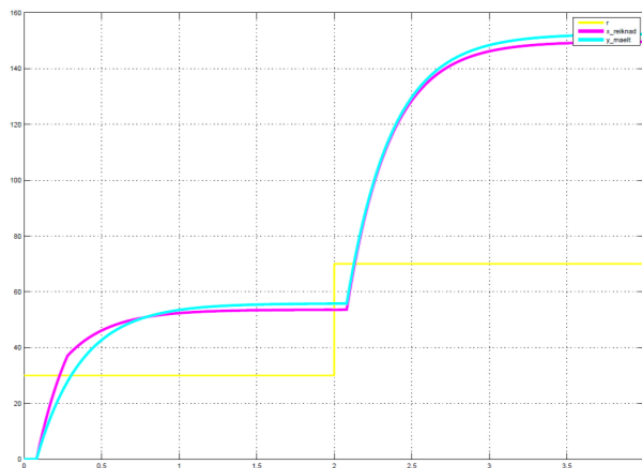
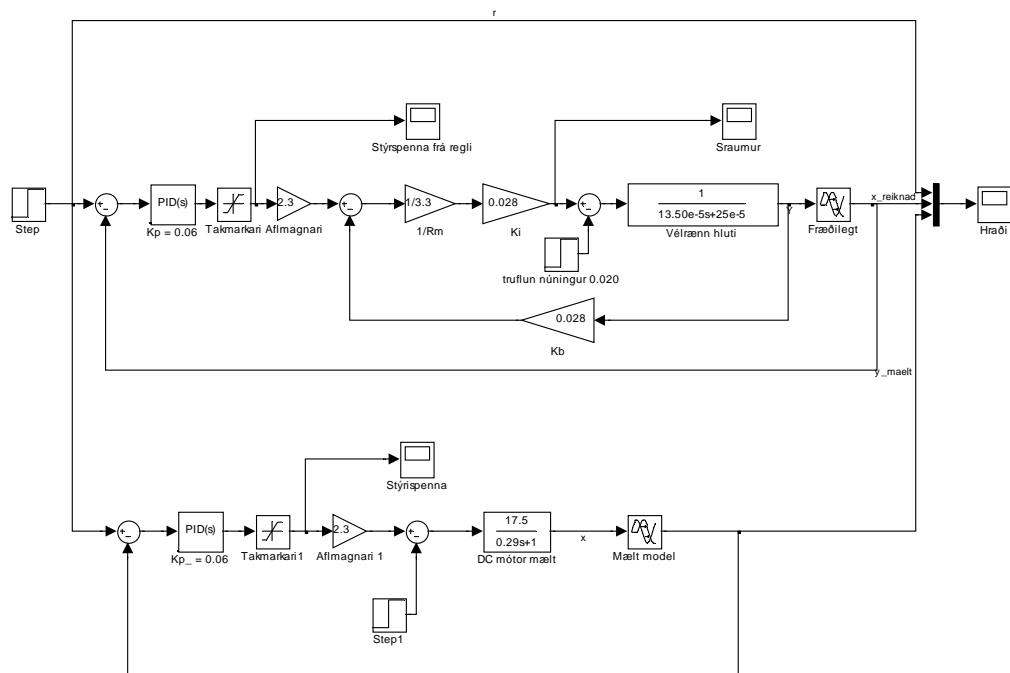
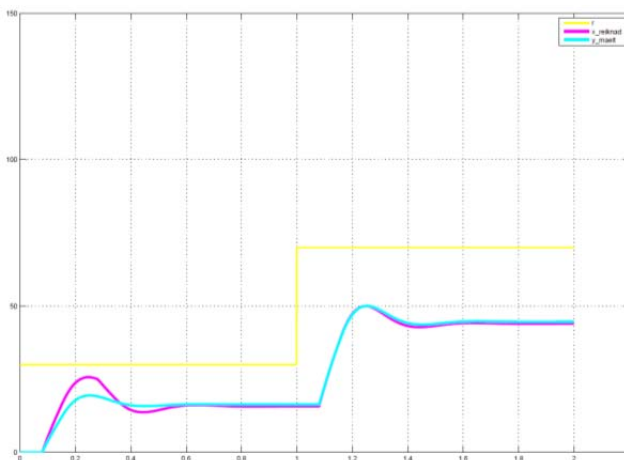


Helstu atriði varðandi lausn á skilaverkefni 1 Reglun 2015

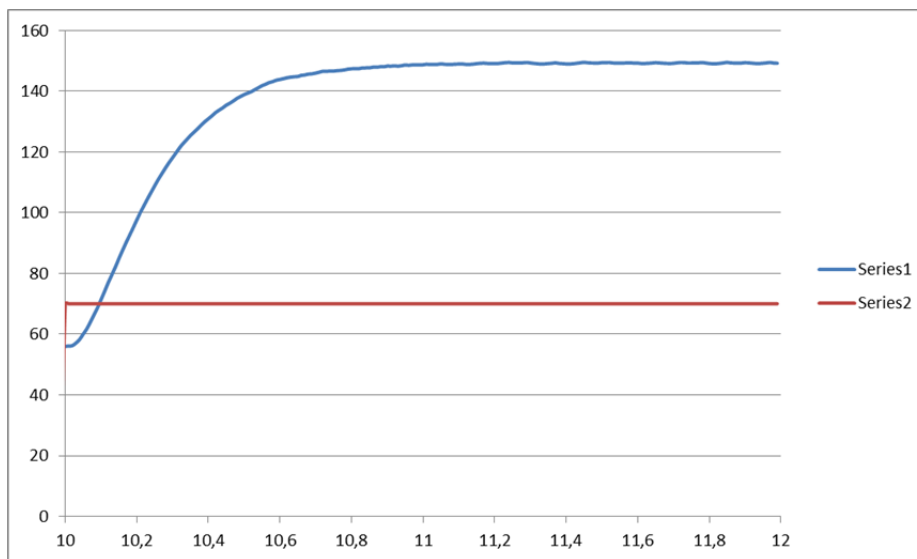


Ekki afturverkun



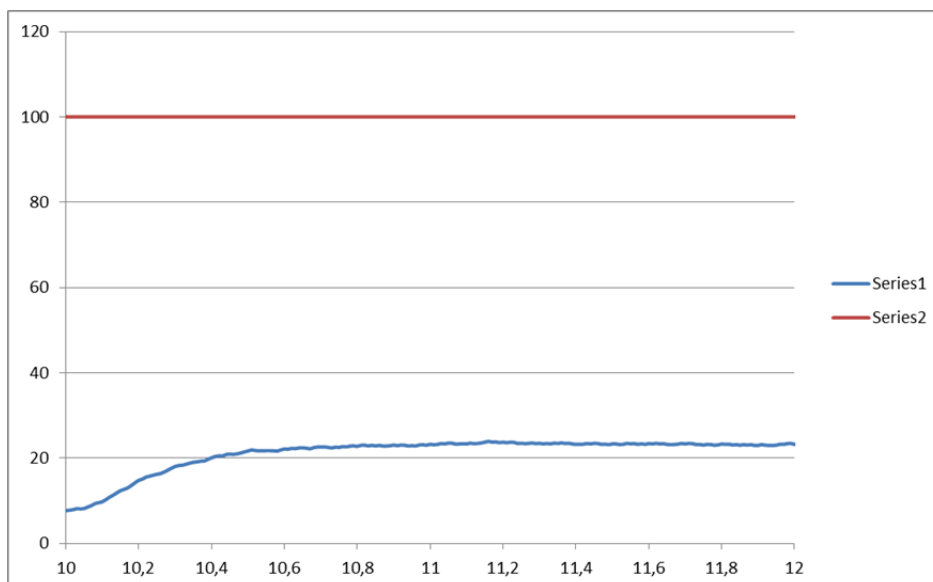
Afturverkun $K_p = 0.06$

Mælingar:



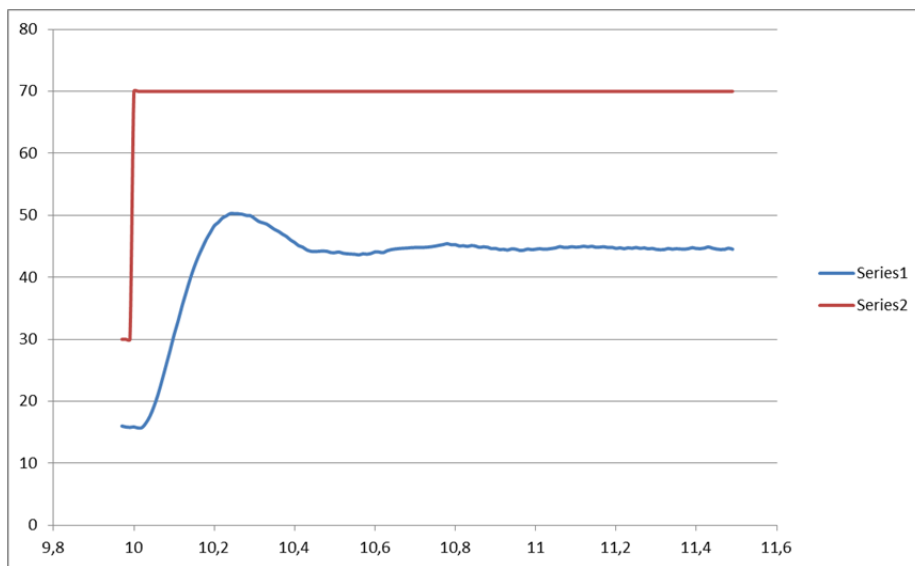
Mæling opin rás: $K_p = 0.06$ Innmerki 30 til 70 rad/s

Mældur tímafasti $T = 0.28s$ Mæld heildarmögnun $K = 2.326$



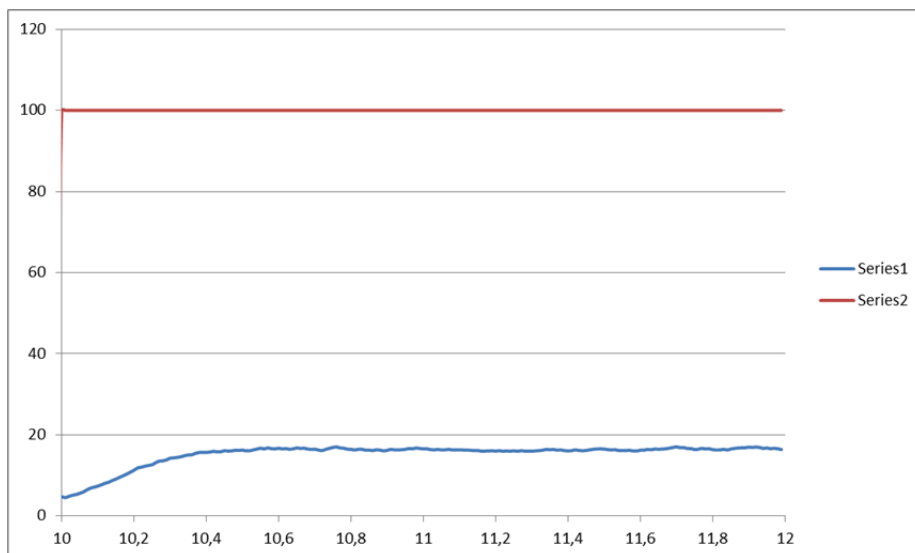
Mæling opin rás $K_p = 0.01$ Innmerki 60 til 100 rad/s

Mældur tímafasti $T = 0.29s$. Mæld heildarmögnun $K = 0.392$



Mæling lokuð rás: $K_p = 0.06$ innmerki 30 til 70 rad/s Tímaseinkunn $T_s = 0.02$ s

Mældur tímafasti $T = 0.097$. Mæld heildarmögnun $K = 0.725$



Mæling lokuð rás $K_p = 0.01$ innmerki 60 til 100 rad/s Tímaseinkunn $T_s = 0.02$ s

Mæltur tímafasti $T = 0.201$ s Mæld heildarmögnun $K = 0.2904$

Útreikningar:

Lausn skilaverkefni 1

$$R_a := 3.3 \Omega$$

$$K_m := 0.028 \text{ N} \cdot \frac{\text{m}}{\text{A}}$$

$$K_b := 0.028 \text{ V} \cdot \text{s}$$

$$J := 135 \cdot 10^{-6} \text{ kg} \cdot \text{m}^2$$

$$K_a := 2.3$$

Reiknað yfirfærslufall mótors út frá gefnum gildum:

$$\omega_0 := 100 \cdot \frac{1}{\text{s}}$$

$$i_0 := 0.2 \text{ A}$$

$$b := \frac{i_0 \cdot K_m}{\omega_0} = 5.6 \times 10^{-5} \frac{\text{m}^2 \cdot \text{kg}}{\text{s}}$$

b út frá mælingum

$$b := 25 \cdot 10^{-5} \frac{\text{m}^2 \cdot \text{kg}}{\text{s}}$$

$$\tau_1 := \frac{J}{\left(b + \frac{K_m \cdot K_b}{R_a} \right)} = 0.277 \text{ s}$$

$$K_1 := \frac{\frac{K_m}{R_a}}{\left(b + \frac{K_m \cdot K_b}{R_a} \right)} = 17.402 \cdot \frac{1}{\text{V} \cdot \text{s}}$$

$$G(s) = \frac{17.4}{0.277s + 1}$$

Mælt yfirfærslufall út frá opinni rás

$$T(s) = K_p \cdot K_a \cdot G(s)$$

$$K_p := 0.01 \text{ V} \cdot \text{s} \quad K_{o1} := 0.3921 \quad \tau_{o1} := 0.29 \cdot \text{s}$$

$$K'_{o1} := \frac{K_{o1}}{K_p \cdot K_a} = 17.048 \frac{1}{\text{Wb}}$$

$$K_p := 0.03 \text{ V}\cdot\text{s} \quad K_{o2} := 1.166 \quad \tau_{o2} := 0.29 \text{ s}$$

$$K'_{o2} := \frac{K_{o2}}{K_p \cdot K_a} = 16.899 \frac{1}{\text{Wb}}$$

$$K_p := 0.06 \text{ V}\cdot\text{s} \quad K_{o3} := 2.326 \quad \tau_{o3} := 0.28 \text{ s}$$

$$K'_{o3} := \frac{K_{o3}}{K_p \cdot K_a} = 16.855 \frac{1}{\text{Wb}}$$

$$K_o := \frac{(K'_{o1} + K'_{o2} + K'_{o3})}{3} = 16.934 \frac{1}{\text{V}\cdot\text{s}}$$

$$\tau_o := \frac{(\tau_{o1} + \tau_{o2} + \tau_{o3})}{3} = 0.287 \text{ s}$$

$$G_o(s) = \frac{16.94}{0.287s + 1}$$

Yfirfærslufall út frá opinni rás er næmari gagnvart utanaðkomandi truflun mæling á tímafastu er nokkuð nákvæm en skekkja getur verið í mælingu á mögnun.

$$T_s := 0.02 \text{ s}$$

Yfirfærslufall út frá lokaðri rás

$$K_p := 0.01 \text{ V}\cdot\text{s} \quad K_{l1} := 0.29 \quad \tau_{l1} := 0.201 \text{ s}$$

$$K'_{l1} := \frac{1}{K_p \cdot K_a \cdot \left(\frac{1}{K_{l1}} - 1 \right)} = 17.759 \frac{1}{\text{Wb}}$$

$$\tau'_{l1} := \tau_{l1} \cdot (K_p \cdot K_a \cdot K'_{l1} + 1) = 0.283 \text{ s}$$

$$K_p := 0.03 \text{ V}\cdot\text{s} \quad K_{l2} := 0.559 \quad \tau_{l2} := 0.125 \text{ s}$$

$$K'_{l2} := \frac{1}{K_p \cdot K_a \cdot \left(\frac{1}{K_{l2}} - 1 \right)} = 18.371 \frac{1}{\text{Wb}}$$

$$\tau'_{l2} := \tau_{l2} \cdot (K_p \cdot K_a \cdot K'_{l2} + 1) = 0.283 \text{ s}$$

$$K_p := 0.06 \text{ V}\cdot\text{s} \quad K_{l3} := 0.725 \quad \tau_{l3} := 0.097 \text{ s}$$

$$K'_{l3} := \frac{1}{K_p \cdot K_a \cdot \left(\frac{1}{K_{l3}} - 1 \right)} = 19.104 \frac{1}{\text{Wb}}$$

$$\tau'_{13} := \tau_{13} \cdot (K_p \cdot K_a \cdot K'_{13} + 1) = 0.353 \text{ s}$$

$$K_1 := \frac{K'_{11} + K'_{12} + K'_{13}}{3} = 18.411 \frac{1}{\text{Wb}}$$

$$\tau_1 := \frac{\tau'_{11} + \tau'_{12} + \tau'_{13}}{3} = 0.306 \text{ s}$$

$$G_1(s) = \frac{18.4}{0.31s + 1}$$

Yfirfærslufall út frá lokaðri rás er næmari fyrir tímaseinkun ef mögnun er mikil. mæling á tímafastu verður ekki nákvæm en mæling á mögnun nokkuð nákvæm

Notum

$$G(s) = \frac{17.5}{29s + 1}$$