

Vibrations & Control

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HW Set 4

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These problems will be discussed in class on Tuesday, 21 September. You should try to work them beforehand so that you are prepared for the in-class discussion. This material will be on the exam on Thursday 23 September.

1. Ogata, Problem B-4-1. (Ans. 7.5 v)
2. Ogata, Problem B-4-3. (Hint: Add a voltage source (say 1 v) across A - B and compute the current. There will be three loops. Ans = 14.78Ω .)
3. Ogata, Problem B-4-6.
This is similar to Problem A-4-5.

$$\begin{aligned}L \frac{di_1}{dt} + i_1(R_1 + R_2) - i_2 R_2 &= e(t) \\ i_2(R_2 + R_3) - i_1 R_2 + \frac{1}{C} \int i_2 dt &= 0\end{aligned}$$

4. Ogata, Problem B-4-7.
This is similar to Problem A-4-8.

$$i_2(t) = (-e_0/R_{\text{eq}}) \exp(-t/(R_{\text{eq}}C))$$

where $R_{\text{eq}} = R_1 R_2 / (R_1 + R_2)$.