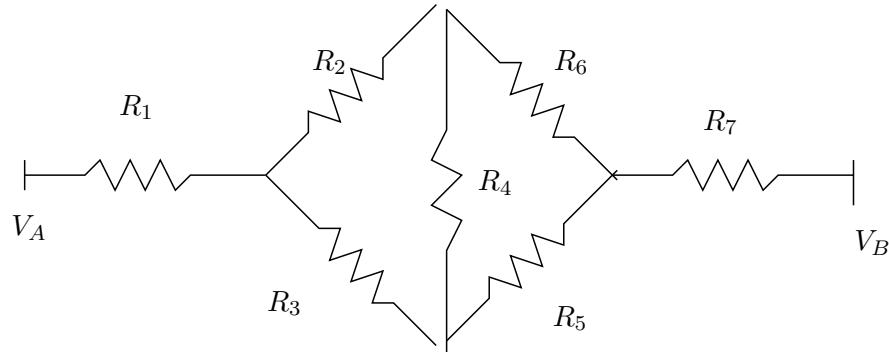


MATH 6643 - Homework 1

Problem Set #1

Do not turn in printouts of your codes. Each problem is worth 5 points.

Problem 1: Consider the following circuit.



The values of the resistances are: $R_1 = 1$, $R_2 = 0.5$, $R_3 = 2$, $R_4 = 0.8$, $R_5 = 3$, $R_6 = 1$ and $R_7 = 1.2$.

Write down the Ohms law equations and the conservation equations (as described in class).

Problem 2: Write a program to compute the LU factorization of matrices, a program to solve lower triangular systems and a program to solve upper triangular systems. Use those programs to find the LU factorization of

$$A = \begin{bmatrix} 2 & 1 & 1 \\ 2 & 2 & 1 \\ 0 & 1 & -1 \end{bmatrix}$$

and solve the linear system

$$Ax = b \text{ with } b = \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix}$$

Problem 3: Let $A, B \in \mathbb{R}^{n \times n}$ be lower triangular. Prove that $C = AB$ is lower triangular.

Problem 4: Let $A, B \in \mathbb{R}^{n \times n}$. Write down (in paper, as in class) an algorithm to compute $C = AB$. What is the complexity of this algorithm?