# NPTEL Basic Linear Algebra 2020
# Assignment 3 - Subjective

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Deadline: Wednesday, February 19, 2020, 23:59 IST

(1) Consider the following homogeneous system of linear equations.

$$x + 2y = 0, \quad ax + 8y + 3z = 0, \quad by + 5z = 0.$$

(a) Find a value of $a$ which will make it necessary during Gaussian elimination to interchange rows in the coefficient matrix. **[2]**

(b) Suppose $a$ does not have the value obtained in part (a). Find the values of $b$ so that the system has a nontrivial solution. **[3]**

(c) Suppsose $a$ does not have the value obtained in part (a) and $b = 100$. Suppose further that the value of $a$ is chosen so that the solution to the system is not unique. Find the general solution to the system. **[5]**

(2) Consider the following system of equations.

$$\left[x + y + z = 2, \quad x + 3y + 3z = 0, \quad x + 3y + 6z = 3.\right]$$

(a) Use Gaussian elimination to convert the coefficient matrix to REF. **[2]**

(b) Solve the system. **[3]**

(c) Let $A$ denote the coefficient matrix given. The rowspace (columnspace) of $A$ is the set of all linear combinations of the rows (columns) of $A$. Find a basis of the rowspace and the columnspace of $A$. **[5]**