

### Assignment for Section 4.3: Complete solution to $Ax = b$

- (1) Describe the column space and nullspace of

$$A = \begin{bmatrix} 2 & 4 & 6 & 4 \\ 2 & 5 & 7 & 6 \\ 2 & 3 & 5 & 2 \end{bmatrix}.$$

And find the complete solution  $\mathbf{x} = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix}$  to  $A\mathbf{x} = \mathbf{b}$  with  $\mathbf{b} = \begin{bmatrix} 4 \\ 3 \\ 5 \end{bmatrix}$ .

- (2) Find the complete solution in the form  $\mathbf{x} = \mathbf{x}_p + \mathbf{x}_n$  to these full rank systems

$$(a) \quad x + y + z = 4 \qquad (b) \quad \begin{array}{l} x + y + z = 4 \\ x - y + z = 4 \end{array}$$

- (3) Suppose the complete solution to  $A\mathbf{x} = \begin{bmatrix} 1 \\ 3 \end{bmatrix}$  is  $\mathbf{x} = \begin{bmatrix} 1 \\ 0 \end{bmatrix} + c \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ , where  $c$  is a constant. Find the matrix  $A$ .

Please submit a hard copy of

- the assignments for **Section 3.3, Section 4.1, Section 4.2, Section 4.3**

at the beginning of class on **20th, December**. Make sure

- (1) your **name, student ID and major** are written on the first page, and
- (2) the papers are stapled together.

**It will not be returned. Please keep a copy for yourself.**