8. Vector Notation

- **Random Vector**

$$\underline{X} = \begin{bmatrix} X_1 \\ \vdots \\ X_n \end{bmatrix} = [X_1 \cdots X_n]' \qquad \text{each } X_i \text{ is RV}$$

column   row   transpose

- **Vector Sample Value**

$$\underline{x} = \begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix} = [x_1 \cdots x_n]'$$

- **Random Vector Probability Functions**

- CDF $F_{\underline{X}}(\underline{x}) = F_{X_1, \cdots, X_n}(x_1, \cdots, x_n)$

- PMF $P_{\underline{X}}(\underline{x}) = P_{X_1, \cdots, X_n}(x_1, \cdots, x_n)$

- PDF $f_{\underline{X}}(\underline{x}) = f_{X_1, \cdots X_n}(x_1, \cdots, x_n)$