PDF Notes

Introduction:

- Used for continuous r.v.
- Denoted as $p(x)$ or $f(x)$

Properties:

1. $p(x) \geq 0 \quad \forall x$

2. $\int_{-\infty}^{\infty} p(x)\,dx = 1$

3. $P(a \leq x \leq b) = \int_{a}^{b} p(x)\,dx$

Distributions:

1. Uniform Distribution:

$$p(x) = \begin{cases} \frac{1}{x_1 - x_0}, & \text{if } x_0 \leq x \leq 1 \\ 0, & \text{otherwise} \end{cases}$$

- States that all values within a given range, $[x_0, x_1]$, are equally likely.

2. Normal / Gaussian Distribution:

$$p(x|\mu, \sigma^2) = \frac{1}{\sqrt{2\pi\sigma^2}} \exp\left(-\frac{1}{2}\left(\frac{(x-\mu)^2}{\sigma^2}\right)\right)$$

μ = mean
σ^2 = variance