ECE 30200 - Probabilistic Methods in Electrical and Computer Engineering

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Contents

Background

The following concepts and formulas will be instrumental and may be familar.

Sequences and Series

$$\sum_{k=0}^{n} r^k = \frac{1-r^{n+1}}{1-r} \tag{1}$$

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6} \tag{2}$$

$$\sum_{k=1}^{\infty} k r^{k-1} = \frac{1}{(1-r)^2} \tag{3}$$

Binomial Theorem

$$\binom{n}{k} = \frac{n!}{k!(n-k)!} \tag{4}$$

$$(a+b)^n = \sum_{k=0}^{n} \binom{n}{k} a^{n-k} b^k \tag{5}$$

$$\binom{n}{k} + \binom{n}{k-1} = \binom{n+1}{k} \tag{6}$$

Taylor Approximation

$$f(x) = f(a) + f'(a)(x-a) + \frac{f''(a)}{2!}(x-a)^2 + \dots \tag{7}$$

$$= \sum_{n=0}^{\infty} \frac{f^{(n)}(a)}{n!}(x-a)^n \tag{8}$$

Reference

Sequences and Series

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