Assignment 7

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May 26, 2022

Outline

Problem Statement

Papoulis Ch-5 Ex 5.29

Using (5-86), find $E(x^3)$ if $\eta_x = 10$ and $\sigma_x = 2$

Equation: 5-86

$$E(g(x)) \approx g(\eta) + g''(\eta)\frac{\sigma^2}{2} \tag{1}$$

where,
η = Mean of the x
σ = Standard Deviation in x

Solution

Let $g(x)$ be a function such that $g(x) = x^3$, we have

$$\eta_x = 10 \tag{2}$$

$$\sigma_x = 2 \tag{3}$$

$$g''(x) = 6x \tag{4}$$

Using Equation (1), we got

$$E(x^3) \approx \eta_x^3 + 6\eta_x \frac{\sigma_x^2}{2} = 10^3 + 6 \times 10 \times \frac{4}{2} = 1120 \tag{5}$$