Machine Learning Assignment 44

Your Name

February 27, 2021

Problem 1

(a)

Solution

$$E[x] = \int_a^b kx\,dx = \frac{kb^2}{2} - \frac{ka^2}{2}$$

$$E[x^2] = \int_a^b kx^2\,dx = \frac{kb^3}{3} - \frac{ka^3}{3}$$

$$E[x^2] - E[x]^2 = \frac{b^3 - a^3}{3} - \frac{(b^2 - a^2)^2}{2}$$

$$k * (\frac{b^3 - a^3}{3} - \frac{b^4 - 2a^2 * b^2 + a^4}{2})$$

Note: No way of simplifying after getting to common denominator so I'm done here

(b)

Solution

$$E[x] = \int \lambda * x * e^{-\lambda*x} = \frac{1}{\lambda}$$

$$E[x^2] = \int \lambda * x * e^{-\lambda*x^2} = \frac{1}{2}$$

$$E[x^2] - E[x]^2 = \frac{1}{2} - \frac{1}{\lambda^2}$$

(c)

Solution

$$E[x] = \lambda$$

$$E[x^2] = \int (x * \frac{\lambda^n * e^{-\lambda}}{n!})^2$$

Should all simplify to just lamda, I can't do that whole integral for $E[x^2]$