HABIB UNIVERSITY

Activity 03
Dr. Shafayat Abrar
CE/MATH 362/322-L1

Course: Statistics and Inferencing
Due Date: Sept. 11, 2023
Due Time: 08:00 PM

Question 01:

Let X denote a Gaussian random variable with mean $\mu_X = 3$ and variance $\sigma_X^2 = 2$. Similarly, let V denote a Gaussian random variable independent of X, with mean $\mu_V = 1$ and variance $\sigma_V^2 = 2$. Now consider the noisy measurement, where V is considered noise

$$Y = 3X + 2V$$

and let us estimate X from the measurement Y using the mean square error criterion as shown below:

$$\widehat{X} = \mathrm{E}[X \mid Y] = \mu_X + \frac{\sigma_{XY}}{\sigma_Y^2}(Y - \mu_Y)$$

Hint: If you need help, look at **Example 1.5** in A.H. Sayed (2008) notes available at LMS.