

THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY, PATIALA
Department of Electronics and Communication Engineering
UEC310 – Information and Communication Theory

TUTORIAL - 8

Q1	<p>Let A, B, and C be independent normal $N(1,1)$ random variables. Let $\{X(t), t \in [0, \infty)\}$ be defined as $X(t) = A + Bt$, for all $t \in [0, \infty)$. Also, let $\{Y(t), t \in [0, \infty)\}$ be defined as $Y(t) = A + Ct$, for all $t \in [0, \infty)$. Find $R_{XY}(t_1, t_2)$ and $C_{XY}(t_1, t_2)$, for $t_1, t_2 \in [0, \infty)$.</p>
Q2	<p>Consider a random process $X(t)$ and its derivative, $X'(t) = \frac{d}{dt} X(t)$. Assuming that the derivatives are well-defined, show that</p> $R_{XX'}(t_1, t_2) = \frac{\partial}{\partial t_2} R_X(t_1, t_2)$