STA 312F07 Quiz 2

10 Marks

Let R_1 and R_2 be independent random variables with expected value zero and variance one. Now let

$$\begin{aligned} \xi_1 &= \sqrt{\frac{1+\phi}{2}}\, R_1 + \sqrt{\frac{1-\phi}{2}}\, R_2 \\ \xi_2 &= \sqrt{\frac{1+\phi}{2}}\, R_1 - \sqrt{\frac{1-\phi}{2}}\, R_2 \end{aligned}$$

Find the following. Show your work.

1. $E(\xi_1)$
2. $E(\xi_2)$
3. $Var(\xi_1)$
4. $Var(\xi_2)$
5. $Cov(\xi_1, \xi_2)$
6. $Corr(\xi_1, \xi_2)$ (Recall $Corr(U,V) = \frac{Cov(U,V)}{SD(U)SD(V}$)