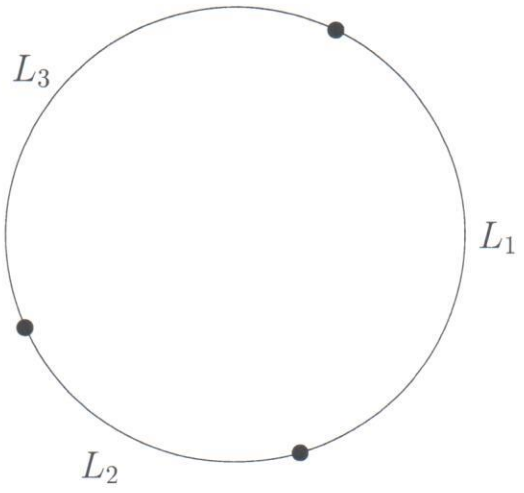
Abbas El Gamal 2014 Quals

# A circle and three random points

Three points are randomly and independently selected on a circle of unit radius. Denote the lengths of the three arcs resulting from this selection by $L_1, L_2$, and $L_3$.




4

1. What is the conditional probability $\mathrm{P}\{L_3 > L_2 | L_2 > L_1\}$?

Cond prob. + 2
Symmetry 2
Work out 2

6

2. Find the correlation coefficient $\rho_{X,Y}$ between $X = (L_2 - L_1)$ and $Y = (L_3 - L_2)$.

Hint: Define $\mathrm{Var}(L_1)$
$\mathrm{Cov}(L_1, L_3)$

Def 1
Symm 2
Work out 3.