MSAI Statistics & Probability – Week 6 Seminar & HW

Problem 1: Consider an Erdős-Rényi random graph $G(n, p)$ on n vertices (that is, for any two vertices, there is an edge between them with probability p and no edge with probability $1 - p$; all edges are independent of each other). Find the **variance** of the number of triangles in $G(n, p)$ (triples of vertices all pairwise connected with an edge). (In previous week HW you had to find the **expectation**).

Problem 2: Find $\mathrm{Var}(\xi)$ if ξ have the following distribution function:

$$F(x) = \begin{cases} 0, & x < -2, \\ 1/5, & -2 \le x < 1 \\ x^2/4, & 1 \le x < 2 \\ 1, & x \ge 2 \end{cases}$$

(In previous week HW you had to find the expectation of ξ).

Problem 3: Can you think of two such **dependent** random variables $\xi,\ \eta$, such that $\mathrm{Cov}(\xi, \eta) = 0$?