Homework Set #1

Problem 1

Suppose that the occurrences of earthquakes and high winds are unrelated. Also suppose that, at a particular location, the probability of a "high" wind occurring in any single minute is 10^{-5} and the probability of a "moderate" earthquake in any single minute is 10^{-8}.

    (a) Find the probability of joint occurrence of the two events during any minute. Building codes do not require the engineer to design buildings for the combined effects of these loads. Is this reasonable?

    (b) Find the probability of the occurrence of one or the other or both during any minute. For rare events, i.e. events with small probabilities of occurrence, the engineer frequently assumes:

$$P(A \cup B) \sim P(A) + P(B)$$

        Is this reasonable?

    (c) If the events in consecutive minutes are mutually independent, what is the probability that there will be no moderate earthquake in a year at this location? In 10 years?

Problem 2

Read Application Example 1 and do Problems 1.1 and 1.5

Problem 3

Read Application Examples 2 and do Problem 2.2