

Homework 1

Problem of the week. A computer hacker launches three independent virus attacks on a server. The first attack is successful with probability 10%, whereas each of the second and the third attacks is successful with probability 20%. Find the probability that the hacker is successful in hacking the sever.

Solution Let A_n denote the event that the n th attack is successful, $n = 1, 2, 3$. Then,

$$\begin{aligned} P(\text{hacker is successful}) &= P(\text{at least one attack succeeds}) \\ &= 1 - P(\text{all attacks fail}) \\ &= 1 - P(A_1^C \cap A_2^C \cap A_3^C) \\ &= 1 - (1 - 0.1)(1 - 0.2)(1 - 0.2) = 1 - (0.9)(0.8)(0.8) \\ &= 1 - 0.576 = \boxed{0.424} \end{aligned}$$

Also solve practice problems 5, 6, and 10a in MB.