Answer on Question #45526, Engineering, SolidWorks — CosmoWorks — Ansys

The probability that a man aged 60 will live to be 70 is 0.65. What is the probability that out of 10 men, now aged 60 (i) exactly 9 will live to be 70 (ii) at most 9 will live to be 70, and (iii) at least 7 will live to be 70?

Solution

Here we are dealing with binomial distribution and hence we will use formula for probability mass function:

$$f(k; n, p) = \Pr(X = k) = \binom{n}{k} p^k (1 - p)^{n-k}$$

where n=60 is number of randomly selected men and p=0.65 is probability.

(i)

exactly 9 will live to be 70. here k=9. so

$$Pr(X = 9) = \binom{10}{9} 0.65^9 (1 - 0.65)^1 = 0.0724917$$

(ii)at most 9 will live to be 70. This can be find as 1 - Pr(only 1 survives to 70) - Pr(0 survived). Hence

$$Pr(X \leq 9) = 1 - \binom{10}{1} 0.65^1 (1 - 0.65)^9 - \binom{10}{0} 0.65^0 (1 - 0.65)^{10} = 0.99946$$

(iii) This can be find as

$$Pr(X = 7) + Pr(X = 8) + Pr(X = 9) + Pr(X = 10) = 0.513827$$