EXAM C QUESTIONS OF THE WEEK

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Week of February 18/08

An insurer has a surplus of 2 at time 0.

The insurer's annual claim distribution is a compound distribution with frequency

 $N = \begin{cases} 0 & \text{prob. .6} \\ 1 & \text{prob. .3} \\ 2 & \text{prob. .1} \end{cases} \text{ and with severity } X = \begin{cases} 1 & \text{prob. .8} \\ 2 & \text{prob. .2} \end{cases}$

The insurer collects a premium of 1 at the start of the first year and 2 at the start of the 2nd year. Find the probability that the insurer's surplus ever falls below 0 during the first two years.

The solution can be found below.

Week of February 18/08 - Solution

The combinations of number of claims and amount of claim that result in surplus below 0 in the first two years are as follows:

Year 1 prob.	Year 2 prob.	combined prob.
1 claim amount 2 (.3)(.2)	2 claims both amount 2 (.1)(.2)(.2)	.00024
2 claims both amount 1 (.1)(.8)(.8)	2 claims both amount 2 (.1)(.2)(.2)	.000256
2 claims one 1, one 2 $2 \times (.1)(.8)(.2)$	2 claims one 1, one 2 $2 \times (.1)(.8)(.2)$.001024
2 claims one 1, one 2 $2 \times (.1)(.8)(.2)$	2 claims both 2 (.1)(.2)(.2)	.000128
2 claims both amount 2 (.1)(.2)(.2) (.1)(.8)(.8)(.1)(.2)(.5)	2) = .000256	.004
Total		.005648