

Re: a simple(?) probability question...

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On 21 Jan 2007 07:56:42 -0800, "Joe" <jconcordia@xxxxxxxxxxx> wrote:

ertug wrote:

hi,

do you have an idea about this question?

* a river dam has a projected life of 50 years. What is the probability that a hundred-year flood will occur once during the life of the dam?

it is apparently simple and i guess the answer is $50/100 = 0.5$; but i am not quite sure and thought there is a catch.

So, do you agree with my answer?

I think you have the right answer. The previous respondent disclosed an elegant statistical procedure,

And he also pointed out that the same reasoning shows that the probability of a 50-year flood occurring is $50/50 = 1$.

You might also note that the same reasoning shows that if the dam lasts 50 years and a flood is expected every 25 years then the probability of a flood during the life of the dam is greater than 1.

Does this still seem right to you?

however I believe the Poisson model may not be the best model for the question at hand. The Poisson distribution is most commonly applied to processes that are considered "continuous". That is, there is a stream of events occurring and the Poisson distribution can be used to estimate the number of events

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occurring in a period of time or during a set of events of a certain number, etc. The 100 year storm is not a continuously occurring event.

Huh?

The binomial distribution seems more appropriate. This is like flipping a coin 100 times. If the coin is completely fair, you would get 50 heads and 50 tails. i.e the probability of a "yes to the storm" (heads) or "no to the storm" (tails) in any given year is 50:50 each year. The cumulative probability ("Z" in the statistical tables) for a "yes" or a "no" half way through the process (the 100 years) is 0.5 if the process is actually "normally" distributed. I did not study the climatological data to know whether or not it is, but I assume the people that set the figures for this applied that logic at the time.

David C. Ullrich

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