6. Exercise: Time until the first failure

Exercises due May 13, 2020 05:29 IST *Completed*

Exercise: Time until the first failure

1/1 point (graded)

Let the sequence X_n, $n = 1, 2, 3, \ldots$, be a Bernoulli process with parameter $\mathbf{P}(X_n = 1) = p$ for all $n \geq 1$. Let U be the time when a value of 0 is first observed: $U = \min\{n : X_n = 0\}$ Then, the random variable U is:

- ○ Geometric with parameter p
- ◉ Geometric with parameter $1 - p$
- ○ None of the above

✔

Solution:

For $n \geq 1$, the event $\{U = n\}$ corresponds to $n - 1$ 1's followed by a 0. Its probability is $p^{n-1}(1 - p)$, which corresponds to a geometric PMF with parameter $1 - p$.

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ℹ Answers are displayed within the problem

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- Geometric progression common ratio (r) vs geometric distribution parameter (p) — 4
  Are these two parameters defined differently? The common ratio (r) is obvious and is the one that is rais...
- Hint? — 4
  I am trying to work this one out, but very confused by the question. Does anyone have a hint on what thi...