Re: Convergence of sequences of RVs

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- *From*: Robert Israel <israel@xxxxxxxxxxxxxxxxxxxxxxxxxxxxx>
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VijaKhara <VijaKhara@xxxxxxxxx> writes:

> Hi all,
>
> I have a problem which is very confusing to me. Can you please give me
> any hints?
>
> −−−−−−−−−−−−−−−−−−−−
> Xn is the number of customers an ATM served up to discrete instant of
> time n. Xn is a Binomial distribution:
>
> P(Xn=k)= n_C_k * p^k *(1−p)^(n−k).
>
> Asume that at time instance N, the ATM breaks down and therefore the
> customer number the ATM served will remain XN thereafter.
>
> N is a random variable with geometric distribution with mean 100.
>
> Does the sequence converge almost surely and if so to what?
> −−
>
> This problem is really confused to me since Ias I understand it, Xn
> obviously converges to XN and the probability of this event is equal
> to the probability of breaking down of the ATM which is 1.
>
> Thus Xn −−> XN with prob = 1 and Xn converges almost surely.
>
> If my thought is reasonable, why do they give some other information
> such as Xn is Binomial and N is Geometric. ...??? I am very confused.

Perhaps the "to what?" means they want the distribution of the limiting random variable XN. [Hint: if the ATM is still working after serving customer #k, what is the probability it will serve at least one more customer?]

> Can you please confirm if my solution is correct?

Yes, it is.
−−
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