

Re: Probability of rth order statistic

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On 3 Dec 2005 19:53:49 -0800, "Patrik" <hosanagar@xxxxxxxxxxx> wrote:

- > I have N variables X1, X2,..., Xn which are all iid random variables. I
- > want to figure out the probability that X1 is ranked "r" in ascending
- > order among the N items.

Isn't it the same for each X_i?
Isn't it simply 1/N for any X_i?

Or am I missing something?

Here's the rest of the post.

- > The CDF of the distribution for these X
- > variables is F. I can think of 2 ways and I can't figure out which one
- > (if any) is correct:
- >
- > 1. The number of ways in which I can choose (r-1) variables to place
- > above X1 (i.e., having values less than X1) are (N-1) choose (r-1),
- > i.e., $(N-1)C(r-1)$. Having chosen these variables, I have to set the
- > corresponding probabilities for values less than and greater than X1:
- >
- > $\Pr(\text{rank}=r) = (N-1)C(r-1) * \{F(X1)^{(r-1)}\} * \{(1-F(X1))^{(n-r)}\}$
- >
- > 2. Someone else suggested I use the pdf of the rth order statistic
- > which is given by:
- >
- > $N! / \{(N-r)!(r-1)!\} * \{F(X1)^{(r-1)}\} * \{(1-F(X1))^{(n-r)}\} * f(b)$
- >
- > Are either of these correct? I am inclined to use the first one because
- > the second one is really Prob (rth order stat = X1) which is different.
- > Maybe, I should use Prob(r-1 order stat < X1) * Prob(r+1 order stat >
- > X1) but do I even need to do that (can formula suffice). I'd appreciate
- > any input.

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 - ◇ *From: Patrik*

- *References:*
 - ◆ *Probability of rth order statistic*
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