

Re: A simple dice rolling problem

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- *From:* "Reef Fish" <large_nassua_grouper@xxxxxxxxxx>
 - *Date:* 16 Aug 2006 22:24:00 -0700
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Reef Fish wrote:

Kevin E. Thorpe wrote:

Reef Fish wrote:

Actually that is NOT my formula (as you noted below also).
It was one
of
many such formulas that I learned from John Pratt in his
74-page paper
(in two parts) in JASA (1968), co-authored with Peizer, who
disappeared
as soon as he finished that joint paper. :-)

Later when John and I wrote a joint paper using Peizer's
result, John
even put up some notice in AMSTAT asking if anyone knew
where
Peizer was. Well, Peizer disappeared without a trace in 1968,
probably
enjoying himself somewhere in the Caribbean or the South
Pacific.

John had about half a dozen "obscure" identities relating the
various
tails of discrete distributions to F and Chi-square, as well as
relating
the tails of several continuous distributions.

I had always been bothered by the waste of time I had to
spend on
teaching students how to use the Binomial tables at the back
of the
book (which are always woefully inadequate), and none of
them has
 $p = 1/6$ for the dice problem. Then there were those normal
approximation and Poisson approximations that are also no

Re: A simple dice rolling problem

good,
but took up the time that should have been spent on
STATISTICS,
such as "a mode is not a mean"! :-)

Later, I noticed even the Bible of statistical distributions
(John and

That's Johnson and Kotz of course, and not John Pratt.

I meant to have put in the side-bar that his 74-page paper in JASA was
possibly be the longest paper ever published in JASA (I think he was
the
Editor of JASA at the time. :-)

A couple of corrections on the above. The two-part paper was only
67 pages,(part I by Peizer and Pratt; part II by Pratt) but is still
long
by JASA standards. John was the Editor of JASA (otherwise the
paper maybe even longer).

But that was a monumental paper
on probability approximations, full of buried treasures.

A second side-bar is that when I did my 1978 JASA paper on the
accuracy of approximations, the Peizer-Pratt methods came out best
in several categories. John said Schleiffer at Harvard had ignored
his results for years and he suddenly found Schleiffer using his
approximations because he had seen the results in JASA. John was
more delighted at Schleiffer's late re-discovery of his 1968 work than
John was himself.

Kotz; later added Balakrisnan) did not, and STILL does not,
have
all of those identities spelled out explicitly in my 1978 JASA
paper.
I couldn't find some of them in the volumes of Encyclopedia
of
Statistical Science either.

So, finally, in 1992, when the computation of probabilities for
continuous distributions are widely available on statistical
packages,
I suggested to the editor of the American Statistician, Bill
Schucany,
that a short paper like that should get people off those terrible

Re: A simple dice rolling problem

tables for discrete distributions.

Bill liked the idea so much that he didn't change a single word in my manuscript (the only time ever in my life that happened on first submission), but thought the title of my paper was too dull, and so he suggested something like the actual title for the paper "Just Say No to Binomial (and other Discrete Distributions) Tables".

14 years later, I think most people are STILL unaware of those "obscure" relations, that covered the negative binomial, Pascal, Poisson, and other tails of distributions to the tails of continuous distributions.

This reminds me: I was told that a number of years ago a favourite comprehensive exam question was something to the effect of, "Which statistical table would you like to have if stranded on an island and why."

The answer of course is F. I knew about getting t, chi-square and normal. Mind you, you would need a pretty comprehensive F table to get useful results for some of these. Apparently you can add binomial to the list.

I have also seen the beta distribution used to obtain binomial probabilities.

That's a different kind of identity, different from relationships between tail probabilities of different distributions.

If you are interested in those, you will find quite a few on pp 1449–50 of the Peizer–Pratt paper (Dec. 1968) in equations (7.1) to (7.19) in the section on Recurrence Relations. The first few are the ones relating binomial terms to difference between the cdfs of beta distributions. That's the only copy of JASA before 2003 I kept. I gave the rest of them to libraries in China. :)

— Reef Fish Bob.

Now I'm going to have to grab a copy of your paper.

Re: A simple dice rolling problem

Make sure you grab the right one. :) The 1992 paper only high-lighted the Binomial-F relation and pointed to the earlier results I extracted out of Pratt's 1968 paper into one little section in my 1978 approximation paper in JASA. The approximation formulas and results are obsolete now because exact results can be quickly computed, but the mathematical identities (5.1) – (5.6) in that paper are the ones that make some discrete distribution tables obsolete.

No relation given for the beta distribution tail except to the F, but the relation between the Poisson tail and Chi-square tail should be useful.

— Reef Fish Bob.