Re: Bell shaped curves

Source: http://sci.tech−archive.net/Archive/sci.math.num−analysis/2007−01/msg00151.html

- *From*: mecej4 <mecej4@xxxxxxxxxxxx>
- *Date*: Tue, 16 Jan 2007 10:54:06 −0600

Stig Holmquist wrote:

> The most common bell shaped curve is the normal or Gaussian but
> not all data forming a symmetrical bell shaped curve are normal.
>
> I wen to Google to search for other bell curves but found none.
> Is there a book discussing other bell curves and how to find
> their standard deviation from the mean?

Kendall's Advanced Theory of Statistics, Volume 1: Distribution Theory,
Oxford Univ. Press, ISBN 0 340 61430 7

E.g the frequencies

> for the popular lotto game Powerball is based on take 5 out of 55 and can yield about 3.5
> million combinations.
> The sums of the various stets of five numbers can range
> from 15 to 265 and their frequencies have a peak value
> of 39361 at 140 but a plot of all frequencies do not fit a
> normal curve perfectly. If the curve were perfectly normal
> one could calculate the std.dev. from the mean 140 by
> mutiplying the total by 0.4 and dividing by 39361 but this
> yields a value of 33.63 after 142 draws, which is less than
> the " theoretical" value of 35.4. The cumulative s.d seems to approach 33.5. Without actually
> calculating the s.d. for the total set
> of 3.5 million how might one estimate most accurately
> the s.d. for the toatal set?

It's not clear why you'd want to find the std.dev. Its significance for any distribution that is not the Gaussian is not the same as for the Gaussian distribution; e.g., the +− 2 \sigma band wound not cover 95 percent.

Note, however, that there is the wonderful Central Limit Theorem, according to which sample means from _any_ continuous distribution, symmetric or not, tend to follow the Gaussian distribution as the sample size becomes large.

Stig Holmquist

−− mecej4
.