Re: weighted sum of independent beta random variables

Source: http://sci.tech−archive.net/Archive/sci.stat.math/2004−10/0454.html

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From: David Jones (*dajxxx_at_ceh.ac.uk*)
Date: 10/27/04

Date: Wed, 27 Oct 2004 13:13:55 +0100

Batu Chalise wrote:
> Dear all,
>
> Is there any closed form expression or approximation for the pdf or
> cdf of a weighted sum of independent beta random variables?
> For example, if W=a_1X_1+a_2X_2+−−−−+ a_nX_n, where a_i's are
> constants and X_i's are beta random variables with parameters (a=1)
> and (b>0), what would be exact or approx. pdf of W? Looking for your
> help.
>
> Best regards,
> Batu

Are these beta bistributions on (0,1) or one of the other forms of beta distributions? If bounded, then you know the bounds on W, which you should take into account in any approximation. You can work out the moments of W and base an approximation on these. You may be able to do something analytical which may help to determine the shape (power behaviour) of the density at the lower and upper bounds, which you could use to help construct an approximation.

You can get and exact formula for the characteristic function of the sum, and an exact formula for inverting this to get the pdf, but I expect this is not what you are looking for.

David Jones