

Class of skew-distributions: theory and applications in biology

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Abstract

In this paper, we study a class of skew-normal distributions driven by the convolution of two independent random variables: a normal and a beta distributed random variables. This problem is motivated by the numerical simulation of the oviductal egg transport in mammals, expressed as a series of microsphere instant velocities regulated by ovarian hormones including estradiol. We propose a closed form convolution formula, represented in terms of the infinite series expanded using Hermite polynomials. We also analyse the convergence of such series and perform the numerical experiments to illustrate these formulae.