

## Computational Methods for Cumulative Distribution Functions.

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Some special functions are particularly relevant in Applied Probability and Statistics. For example, the incomplete gamma and beta functions are (up to normalization factors) the cumulative central gamma and beta distribution functions, respectively. The corresponding noncentral distributions (the Marcum-Q function and the cumulative noncentral beta distribution function) play also a significant role in several applications. The inversion of cumulative distribution functions (CDFs) is also an important problem, in particular for computing percentage points or values of some relevant parameters when the distribution function is involved in hypothesis testing. In this talk, methods for computing and inverting the gamma and beta CDFs are discussed. The performance of the methods will be illustrated with numerical examples. As we will see, we may contemplate CDFs as a branch of the large family of special functions yet probably not so well known as other classical functions.

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