Cumulative distribution functions. Asymptotic representations and inversion methods

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We give examples of cumulative distribution functions in which the normal distribution, or error function, can be used to obtain uniform approximations that are valid for a wide range of the parameters. We explain how uniform approximations can be used for numerical computations and asymptotic inversion methods of cumulative distribution functions, such as incomplete gamma and beta functions, and the non central chi-square distribution, which is also called Marcum Q-function in radar detection and communication problems.