

Chapter 20

Statistical Distribution Functions

1 Scope of the Chapter

This chapter provides procedures for computing the probability corresponding to a given deviate and the deviate corresponding to a given probability for various continuous distributions. The chapter also provides procedures to compute tail and point probabilities for discrete distributions.

2 Available Modules

Module 20.1: `nag_normal_dist` — Probabilities and deviate for a Normal distribution

This module contains *four* procedures to compute:

- probabilities for a Normal distribution;
- the deviate associated with a given probability from a Normal distribution;
- the lower tail probability for a bivariate Normal distribution;
- probabilities for a multivariate Normal distribution.

Module 20.2: `nag_t_dist` — Probabilities and deviate for a Student's *t*-distribution

This module contains *two* procedures to compute:

- probabilities for a Student's *t*-distribution;
- the deviate associated with a given probability from a Student's *t*-distribution.

Module 20.3: `nag_chisq_dist` — Probabilities and deviate for a χ^2 -distribution

This module contains *two* procedures to compute:

- probabilities for a χ^2 -distribution;
- the deviate associated with a given probability from a χ^2 -distribution.

Module 20.4: `nag_f_dist` — Probabilities and deviate for an *F*-distribution

This module contains *two* procedures to compute:

- probabilities for an *F*-distribution;
- the deviate associated with a given probability from an *F*-distribution.

Module 20.5: `nag_beta_dist` — Probabilities and deviate for a beta distribution

This module contains *two* procedures to compute:

- probabilities for a beta distribution;
- the deviate associated with a given probability from a beta distribution.

Module 20.6: `nag_gamma_dist` — **Probabilities and deviate for a gamma distribution**

This module contains *two* procedures to compute:

- probabilities for a gamma distribution;
- the deviate associated with a given probability from a gamma distribution.

Module 20.7: `nag_discrete_dist` — **Probabilities for a discrete distribution**

This module contains *three* procedures to compute the upper tail, lower tail and point probabilities for the following discrete distributions:

- binomial distribution;
- Poisson distribution;
- hypergeometric distribution.