A Sample Document Using glossaries.sty

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Abstract

This is a sample document illustrating the use of the glossaries package. The functions here have been taken from "Tables of Integrals, Series, and Products" by I.S. Gradshteyn and I.M Ryzhik. The glossary is a list of special functions, so the equation number has been used rather than the page number. This can be done using the `counter=equation` package option.

Index of Special Functions and Notations

Notation	Function Name	Number of Formula
$B(x, y)$	Beta function	3.1–3.3
$B_x(p, q)$	Incomplete beta function	3.4
C	Euler's constant	9.1
$D_p(z)$	Parabolic cylinder functions	7.1
$\mathrm{erf}(x)$	Error function	2.1
erfc	Complementary error function	2.2
$F(\phi, k)$	Elliptical integral of the first kind	8.1
G	Catalan's constant	9.2
$\Gamma(z)$	Gamma function	1.1, 1.2, 1.5
$\gamma(\alpha, x)$	Incomplete gamma function	1.3
$\Gamma(\alpha, x)$	Incomplete gamma function	1.4
$H_n(x)$	Hermite polynomials	4.3
$k_\nu(x)$	Bateman's function	6.2
$\Phi(\alpha, \gamma; z)$	confluent hypergeometric function	6.1
$\psi(x)$	Psi function	1.6
$T_n(x)$	Chebyshev's polynomials of the first kind	4.1

Notation	**Function Name**	**Number of Formula**
$U_n(x)$	Chebyshev's polynomials of the second kind	4.2
$Z_\nu(z)$	Bessel functions	5.1

Chapter 1

Gamma Functions

$$\Gamma(z) = \int_0^\infty e^{-t} t^{z-1}\, dt \tag{1.1}$$

`\ensuremath` is only required here if using hyperlinks.

$$\Gamma(x+1) = x\Gamma(x) \tag{1.2}$$

$$\gamma(\alpha, x) = \int_0^x e^{-t} t^{\alpha-1}\, dt \tag{1.3}$$

$$\Gamma(\alpha, x) = \int_x^\infty e^{-t} t^{\alpha-1}\, dt \tag{1.4}$$

$$\Gamma(z) = \Gamma(\alpha, x) + \gamma(\alpha, x) \tag{1.5}$$

$$\psi(x) = \frac{d}{dx} \ln \Gamma(x) \tag{1.6}$$

Chapter 2

Error Functions

$$\mathrm{erf}(x) = \frac{2}{\sqrt{\pi}} \int_0^x e^{-t^2}\, dt \tag{2.1}$$

$$\mathrm{erfc} = 1 - \mathrm{erf}(x) \tag{2.2}$$

Chapter 3

Beta Function

$$B(x, y) = 2 \int_0^1 t^{x-1}(1 - t^2)^{y-1}\, dt \tag{3.1}$$

Alternatively:

$$B(x, y) = 2 \int_0^{\frac{\pi}{2}} \sin^{2x-1} \phi \cos^{2y-1} \phi \, d\phi \tag{3.2}$$

$$B(x, y) = \frac{\Gamma(x)\Gamma(y)}{\Gamma(x + y)} = B(y, x) \tag{3.3}$$

$$B_x(p, q) = \int_0^x t^{p-1}(1 - t)^{q-1}\, dt \tag{3.4}$$

Chapter 4

Polynomials

4.1 Chebyshev's polynomials

$$T_n(x) = \cos(n \arccos x) \tag{4.1}$$

$$U_n(x) = \frac{\sin[(n+1)\arccos x]}{\sin[\arccos x]} \tag{4.2}$$

4.2 Hermite polynomials

$$H_n(x) = (-1)^n e^{x^2} \frac{d^n}{dx^n}(e^{-x^2}) \tag{4.3}$$

4.3 Laguerre polynomials

$$L_n^\alpha(x) = \frac{1}{n!} e^x x^{-\alpha} \frac{d^n}{dx^n}(e^{-x} x^{n+\alpha}) \tag{4.4}$$

Chapter 5

Bessel Functions

Bessel functions Z_ν are solutions of

$$\frac{d^2 Z_\nu}{dz^2} + \frac{1}{z}\frac{dZ_\nu}{dz} + \left(1 - \frac{\nu^2}{z^2} Z_\nu = 0\right) \tag{5.1}$$

Chapter 6

Confluent hypergeometric function

$$\Phi(\alpha, \gamma; z) = 1 + \frac{\alpha}{\gamma}\,\frac{z}{1!} + \frac{\alpha(\alpha+1)}{\gamma(\gamma+1)}\,\frac{z^2}{2!} + \frac{\alpha(\alpha+1)(\alpha+2)}{\gamma(\gamma+1)(\gamma+2)}\,\frac{z^3}{3!} + \cdots \tag{6.1}$$

$$k_\nu(x) = \frac{2}{\pi}\int_0^{\pi/2} \cos(x\tan\theta - \nu\theta)\,d\theta \tag{6.2}$$

Chapter 7

Parabolic cylinder functions

$$D_p(z) = 2^{\frac{p}{2}} e^{-\frac{z^2}{4}} \left\{ \frac{\sqrt{\pi}}{\Gamma\left(\frac{1-p}{2}\right)} \Phi\left(-\frac{p}{2}, \frac{1}{2}; \frac{z^2}{2}\right) - \frac{\sqrt{2\pi} z}{\Gamma\left(-\frac{p}{2}\right)} \Phi\left(\frac{1-p}{2}, \frac{3}{2}; \frac{z^2}{2}\right) \right\} \tag{7.1}$$

Chapter 8

Elliptical Integral of the First Kind

$$F(\phi, k) = \int_0^{\phi} \frac{d\alpha}{\sqrt{1 - k^2 \sin^2 \alpha}} \tag{8.1}$$

Chapter 9

Constants

$$C = 0.577\,215\,664\,901\ldots \tag{9.1}$$

$$G = 0.915\,965\,594\ldots \tag{9.2}$$