Sample Document Using Interchangable Numbering

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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 lists both page numbers and equation numbers. Since the majority of the entries use the equation number, `counter=equation` was used as a package option. Note that this example will only work where the page number and equation number compositor is the same. So it won't work if, say, the page numbers are of the form 2-4 and the equation numbers are of the form 4.6. As most of the glossary entries should have an italic format, it is easiest to set the default format to italic.

Contents

Index of Special Functions and Notations

Numbers in italic indicate the equation number, numbers in bold indicate page numbers where the main definition occurs.

Notation	**Function Name**	
$\Phi(\alpha, \gamma; z)$	confluent hypergeometric function	*8.1*
$\psi(x)$	Psi function	*1.6*
$T_n(x)$	Chebyshev's polynomials of the first kind	*4.1*
$U_n(x)$	Chebyshev's polynomials of the second kind	*4.2*
$Z_\nu(z)$	Bessel functions	*7.1*

Chapter 1

Gamma Functions

The gamma function is defined as

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

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

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

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

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

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

Chapter 2

Error Functions

The error function is defined as:

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

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

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

Chebyshev's polynomials

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

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

Chapter 5

Hermite polynomials

$$H_n(x) = (-1)^n e^{x^2} \frac{d^n}{dx^n}(e^{-x^2}) \tag{5.1}$$

Chapter 6

Laguerre polynomials

$$L_n^\alpha(x) = \frac{1}{n!} e^x x^{-\alpha} \frac{d^n}{dx^n}(e^{-x} x^{n+\alpha}) \tag{6.1}$$

Chapter 7

Bessel Functions

Bessel functions $Z_\nu(z)$ are solutions of

$$\frac{d^2 Z_\nu}{dz^2} + \frac{1}{z}\frac{dZ_\nu}{dz} + \left(1 - \frac{\nu^2}{z^2} Z_\nu = 0\right) \tag{7.1}$$

Chapter 8

Confluent hypergeometric function

$$\Phi(\alpha, \gamma; z) = 1 + \frac{\alpha}{\gamma}\,\frac{z}{1!} + \frac{\alpha(\alpha+1)}{\gamma(\gamma+1)}\,\frac{z^2}{2!} + \frac{\alpha(\alpha+1)(\alpha+2)}{\gamma(\gamma+1)(\gamma+2)}\,\frac{z^3}{3!} + \cdots \tag{8.1}$$

$$k_\nu(x) = \frac{2}{\pi}\int_0^{\pi/2} \cos(x\tan\theta - \nu\theta)\, d\theta \tag{8.2}$$

Chapter 9

Parabolic cylinder functions

$$D_p(z) = 2^{\frac{p}{2}} e^{-\frac{z^2}{4}} \left\{ \frac{\sqrt{\pi}}{\Gamma\left(\frac{1-p}{2}\right)} \Phi\left(-\frac{p}{2}, \frac{1}{2}; \frac{z^2}{2}\right) - \frac{\sqrt{2\pi} z}{\Gamma\left(-\frac{p}{2}\right)} \Phi\left(\frac{1-p}{2}, \frac{3}{2}; \frac{z^2}{2}\right) \right\} \tag{9.1}$$

Chapter 10

Elliptical Integral of the First Kind

$$F(\phi, k) = \int_0^{\phi} \frac{d\alpha}{\sqrt{1 - k^2 \sin^2 \alpha}} \tag{10.1}$$

Chapter 11

Constants

$$C = 0.577\,215\,664\,901\ldots \tag{11.1}$$

$$G = 0.915\,965\,594\ldots \tag{11.2}$$