Elliptic Integrals

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Mission Technologies

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Overview

1. Theoretics
2. Numerics
3. Backup Slides

Incomplete Elliptic Integrals

$$K(k) = \int_0^{\phi} \frac{d\theta}{\sqrt{1 - k^2 \sin^2 \theta}} \qquad \textbf{1st kind} \qquad (1.1)$$

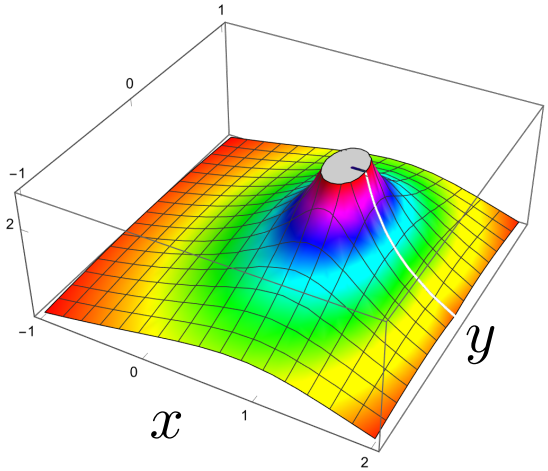
$$E(k) = \int_0^{\phi} \sqrt{1 - k^2 \sin^2 \theta} d\theta \qquad \textbf{2nd kind} \qquad (1.2)$$

$$\Pi(n; k, \phi) = \int_0^{\phi} \frac{1}{1 - n^2 \sin \theta} \frac{d\theta}{\sqrt{1 - k^2 \sin^2 \theta}} \qquad \textbf{3rd kind} \quad (1.3)$$

Incomplete Elliptic Integral of the First Kind

$$K(k) = \int_0^{\phi} \frac{d\theta}{\sqrt{1 - k^2 \sin^2 \theta}} \qquad \textbf{1st kind} \qquad \textbf{(1.1)}$$

$Re\left(K(x+iy)\right)$



$Im\left(K(x+iy)\right)$

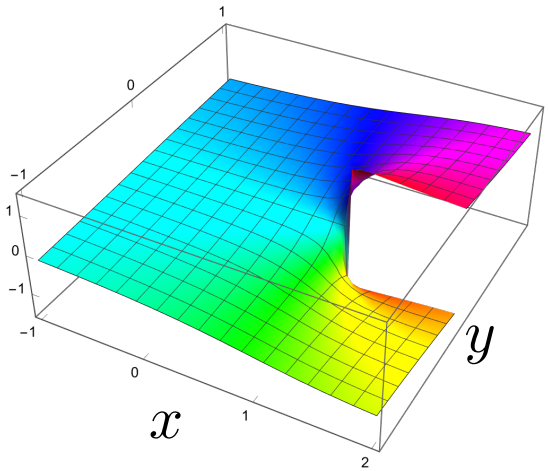


Table: $K(x+iy)$ **is analytic in the complex plane excluding** $[1, \infty)$

Gil, Segura, and Temme 2007, p. 344

Control Factors

Control Factors

Professional Societies: Computational Mechanics

Bibliography I

[1] Amparo Gil, Javier Segura, and Nico M. Temme. **Numerical Methods for Special Functions.** Society for Industrial and Applied Mathematics, 2007.

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