Berry, M. V.

Uniform asymptotic smoothing of Stokes' discontinuities. (English) Zbl 0683.33004

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Stokes' discontinuities occur in the asymptotic approximation of functions defined by integrals or differential equations and dependent on a large complex parameter λ. Usually several asymptotic estimates are available in different sectors of the complex λ-plane. At the border lines of the sectors, usually called Stokes lines, the change in the approximations is not always smooth; the jumps may be exponentially large. If the expansion is truncated near its least term, the change may be smooth, and can be described in terms of an error function. This new interpretation introduces an interesting development in the theory of asymptotic expansions. The author uses the formalism of Dingle to describe the phenomenon, and he gives numerical illustrations for Dawson's integral and Airy functions.

Reviewer: N.M.Temme

MSC:

33B20 Incomplete beta and gamma functions (error functions, probability integral, Fresnel integrals)
30E15 Asymptotic representations in the complex plane
41A60 Asymptotic approximations, asymptotic expansions (steepest descent, etc.)

Keywords:

Stokes' phenomenon; error function

Full Text: DOI