

INTRODUCTION

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2. Description of the Tables

2.1. The complete integral of the differential equation (2) may be written in the form

$$y = A Ai(x) + B Bi(x) \quad (3)$$

where A and B are constants, and $Bi(x)$ is a suitably chosen independent solution of (2) that is defined in §4. The tables are concerned mainly with $Ai(x)$ and its derivative; every solution of (2) which remains finite as $x \rightarrow \infty$ is a multiple of this integral, which itself tends to zero as $x \rightarrow \infty$.

The complete integral of (2) can also be written in the form

$$y = C F(x) \sin \{\chi(x) + \epsilon\} \quad (4)$$

in which C and ϵ are arbitrary constants. If we take

$$C^2 = A^2 + B^2 \quad \tan \epsilon = B/A \quad (5)$$

where A and B are the same constants as in (3), then

$$Ai(x) = F(x) \sin \chi(x) \quad Bi(x) = F(x) \cos \chi(x) \quad (6)$$

The corresponding derivative can be similarly expressed, with the *same* constants C and ϵ , as

$$y' = C G(x) \sin \{\psi(x) + \epsilon\} \quad (7)$$

where

$$Ai'(x) = G(x) \sin \psi(x) \quad Bi'(x) = G(x) \cos \psi(x) \quad (8)$$

The tables aim at an 8-figure standard of accuracy throughout for $Ai(x)$, $Bi(x)$ and their derivatives; this corresponds to 6 decimals of a degree in the phases $\chi(x)$ and $\psi(x)$ in Table VII, and to 9 decimals for $\pm \tau = 0.1 Bi'(\pm x)$ in Table IV. Reduced derivatives of higher order in Table IV are given to the 10 decimals needed for interpolation of $Bi'(x)$ to 8 decimals.

Provision for interpolation is made everywhere (except of course in Tables III and V); the desire to make this provision resulted in a decision to tabulate $\log_{10} Ai(x)$, $Ai'(x)/Ai(x)$, $\log_{10} Bi(x)$ and $Bi'(x)/Bi(x)$ in Tables II and VI. The details of interpolation are discussed in §3; BRITISH ASSOCIATION *Auxiliary Table I* is available to assist in this process.

2.2. *Notation for Reduced Derivatives.* The operator τ is defined by

$$\tau \phi(x, h) = \int_0^h \frac{\partial}{\partial x} \phi(x, t) dt \quad (9)$$