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Calculation of the Stokes' multipliers for a polynomial system of rank 1 having distinct eigenvalues at infinity

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0. Introduction

Computation of the Stokes' multipliers and / or central connection matrices (hereafter referred to as connection data) for systems of the form

$$zx' = (zA_o + A_1)x, \tag{0.1}$$

with $n \times n$ constant matrices A_o, A_1, or equivalently computation of connection constants for the so-called *hyper-geometric system* (compare below), has attracted considerable attention lately. In case $n = 2$ and A_o having two distinct eigenvalues, the connection data can be explicitly computed using Gamma functions in the parameters of (0.1); see Jurkat, Lutz, and Peyerimhoff [4], and Kohno and Yokoyama [10], e.g. The same holds true for general n and A_o being a diagonal matrix with zeros and a single one along the diagonal; see Balser [3] and Okubo, Takano, and S. Yoshida [6]. Other cases of (0.1) have been treated by Yokoyama [8], [9], [10], who obtained under various assumptions upon n and / or the eigenvalues of A_o and A_1, together with other generic restrictions, explicit formulas in terms of classical special functions.

Aside from very special situations as the ones described above, no such explicit formulas for the connection data of (0.1) have been found and, to the author's opinion, may not exist. Instead, it appears reasonable to regard these data as being "new" special functions in the parameters of (0.1) and look for representations of them in terms of infinite series, or integrals, etc. In [2], such representations for the Stokes' multipliers of (0.1) (in case A_o has n distinct eigenvalues) are given. The terms of these series involve functions which are recursively defined and, although interesting in their own right, are relatively complicated. In the present paper, we obtain representations which are much simpler and (aside from explicit rational terms) involve solutions of a difference equation closely related to a system of the form (0.1), but of dimension $n - 1$. To do so, we use results of R. Schäfke [7], who showed