Asymptotic forms and asymptotic expansions of solutions to the fifth Painlevé equation

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Abstract

We consider the fifth Painlevé equation. For all values of its complex parameters we are looking for the expansions of its solutions of the form $\sum_{\mathbf{K}} c_s(z) z^s$, where $\mathbf{K}$ is a countable set, $c_s(z)$ are either complex constants, or polynomials, or series in $\log z$, or elliptic functions of z^a, $a \in \mathbb{R}$.