Asymptotical expansions of the solutions to the sixth Painlevé equation

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Abstract

We consider the sixth Painlevé equation in three cases: 1)$a \cdot b \neq 0$; 2) $a = 0$, $b \neq 0$; 3) $a = b = 0$. By the methods of Power Geometry, near the singular points $x = 0$ and $x = \infty$, we have found all power, power-logarithmic and complicated expansions of its solutions. We obtain 30 families in the case $a \cdot b \neq 0$; 22 families in the case $a = 0$, $b \neq 0$ and 14 families in the case $a = b = 0$.