

# Real solutions of the first Painlevé equation with large initial data

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We consider three special cases of the initial value problem of the first Painlevé (PI) equation. Our approach is based on the method of *uniform asymptotics* introduced by Bassom et al. (Arch. Rational Mech. Anal., 1998). A rigorous proof of a property of the PI solutions on the negative real axis, recently revealed by Bender and Komijani (J. Phys. A, 2015), is given by approximating the Stokes multipliers. Moreover, we build more precise relation between the large initial data of the PI solutions and their three different types of behavior as the independent variable tends to negative infinity. In addition, some limiting form connection formulas are obtained.