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Robert Buckingham*, Department of Mathematical Sciences, The University of Cincinnati, P.O. Box 210025, Cincinnati, OH 45221, and **Peter D. Miller**. *Asymptotics of rational Painlevé II solutions.*

The nonhomogenous Painlevé II equation has exactly one rational solution for specific values of the nonhomogenous term α . The real zeros of these rational functions have recently been shown to play an important role in a certain double-scaling limit for small-dispersion solutions of the sine-Gordon equation. Clarkson and Mansfield observed that the complex zeros (or poles) of the rational Painlevé II functions appear to have a highly regular triangular structure. We prove that, in the large- α limit, the scaled zeros (or poles) fill out a certain curvilinear triangular region in the complex plane. We also discuss progress on computing the leading-order asymptotic behavior of the rational solutions inside, outside, and at the edge of this root region. (Received December 13, 2011)