Location of Poles for the Hastings-McLeod Solution to the Second Painlevé Equation

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In this talk, we show that the well-known Hastings-McLeod solution to the second Painlevé equation is pole-free in the region $\arg x \in [-\frac{\pi}{3}, \frac{\pi}{3}] \cup [\frac{2\pi}{3}, \frac{4\pi}{3}]$, which proves an important special case of a general conjecture concerning pole distributions of Painlevé transcedents proposed by Novokshenov. Our strategy is to construct explicit quasi-solutions approximating the Hastings-McLeod solution in different regions of the complex plane, and estimate the errors rigorously. Joint work with Min Huang and Shuai-Xia Xu.