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Painleve I equation and modular forms

The isomonodromic tau function of the Painleve I equation can be presented as a Fourier transform of the partition function of the Argyres-Douglas theory of type H_0. A possible way to derive this partition function is to use the holomorphic anomaly equation (HAE) as a recursive relation for the topological expansion of corresponding free energy (logarithm of the partition function). The solution of HAE is given in terms (quasi)modular forms of $SL(2,\mathbb{Z})$. We propose a basis in the space of modular forms, allowing us to prove the uniqueness of HAE's solution.

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