On a new transformation of the one-dimensional Schrödinger equation and higher order WKB-type asymptotics

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We put forward a new transformation of the one dimensional Schrodinger equation with non-smooth potentials from L_p with $p > 2$. This transformation yields existence of the Weyl solution with higher order WKB-type asymptotic behavior valid in certain domains in the upper half plane asymptotically approaching the real line. We apply our approach to the study of high-energy asymptotics for the Titchmarsh-Weyl m-function improving on many relevant results of others.