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On the exact WKB analysis for higher order differential equations — virtual turning points, new Stokes curves, and some recent results related to them

Abstract: As was first pointed out by Berk et al., new Stokes curves play a crucially important role in discussing connection problems and Stokes phenomena for higher order linear ordinary differential equations. Later, to clarify the meaning of new Stokes curves and their relationship with the Borel resummation technique, Aoki, Kawai and I introduced the notion of virtual turning points, that is, turning points from which new Stokes curves emanate. The introduction of virtual turning points is really successful, but still there remain some important open problems. For example, the Borel summability of WKB solutions of higher order linear ordinary differential equations outside (ordinary and new) Stokes curves is not established yet in general.

In this talk I will first give a brief survey on the fundamental part of the theory of virtual turning points and then discuss some open problems for them. In particular, I will explain some recent results related to virtual turning points and new Stokes curves (such as the Borel summability of formal solutions of inhomogeneous second order equations, and so on).