Stokes Phenomenon and Hawking Radiation

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Hawking's seminal study on black holes has shown that these compact objects can slowly decay by emitting particles. By tracing the solutions backwards in time, Hawking observed that positive energy solution in early times can turn into a mixture of positive and negative energy solutions in asymptotically late times, signaling the particle emission. This mechanism although similar to the Schwinger mechanism is quite distinct for the reason that background metric is not fixed. Later prominent analyses has shown how such mechanism could work in a static background, without having to deal with the collapse geometry. In the context of the latter approach, I will discuss how Stokes phenomenon could be relevant for the Hawking radiation and contrast the results for the greybody factors, coming from standard WKB method and the method of asymptotic matching.