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On the parametric Stokes phenomenon for singularly perturbed linear PDEs

We study a family of singularly perturbed linear partial differential equations with irregular type in the complex domain. In a previous work, we have given sufficient conditions under which the Borel transform of a formal solution with respect to the perturbation parameter converges near the origin in the complex domain and can be extended on a finite number of unbounded sectors with small aperture. The proof rests on the construction of neighboring sectorial holomorphic solutions whose difference have exponentially small bounds in the perturbation parameter (Stokes phenomenon) for which the classical Ramis-Sibuya theorem can be applied. In this talk, we introduce new conditions for the Borel transform to be analytically continued in larger sectors where it develops isolated singularities of logarithmic type lying on some half lattice. In the proof, we use a criterion of analytic continuation of the Borel transform introduced recently by A. Fruchard and R. Schaefer and is based on a more accurate description of the Stokes phenomenon for the sectorial solutions mentioned above.