Name : Kohei Iwaki

Research field : Differential Equations

Keywords : Exact WKB analysis, Painlevé euation, topological recursion

Current Research :

I'm studying singularly-perturbed differential equations with a small parameter from the view point of the exact WKB analysis. The method is based on the classical WKB (Wentzel-Kramers-Brillouin) method in quantum mechanics and the Borel summation method (or the resurgent analysis) for divergent series. For second-order linear ODEs, the exact WKB analysis allows us to describe global behaviors (monodromy, Stokes structure etc.) of solutions in terms of certain generating series (called the Voros coefficients) of period integrals over the algebraic curve obtained as the classical limit of the differential equation. I'm also interested in connections among the exact WKB analysis and other research topics, including resurgent analysis, cluster algebras, topological recursion, and Painlevé equations.

Notice for students :

I am expecting that students who wish to work with me will have basic knowledge of complex analysis, differential equations on the complex domain (monodoromy group, Stokes phenomenon etc.), and special functions. These knowledge are helpful, but I'm also expecting that you will have other abilities: For example, you should be able to complete a long and tedious calculation. I also expect that you will absorb various knowledge and ideas of mathematical sciences through the discussion with many people along with your intellectual curiosity.