Wednesday May 31 and Thursday June 1

10:30 - 12:30   Nikita Nikolaev

Title: Geometry and Borel Summability of Exact WKB Solutions

Abstract:

One of the most classical settings for Exact Perturbation Theory is the exact WKB method for solving singularly perturbed linear ODEs such as the Schrödinger equation. Such ODEs can be easily solved in exponential power series: this is the famous WKB ansatz. The resulting formal WKB solutions, however, are always divergent and therefore have no direct analytic meaning. Attempting to apply the Borel resummation to get true analytic solutions turns out to be the correct approach, but a difficult mathematical problem, especially for equations of higher-order. I will describe a solution to this problem that I have developed through a series of recent works. Another outcome of this solution is that the constructions involved in the proof can be made completely geometrically invariant. So I will also describe an algebro-geometric formulation of the WKB method for meromorphic connections in terms of invariant splittings of bundle extensions.