Computing D-Finite Symmetric Scalar Products in Order to Count Regular Graphs

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In this talk I will retrace the evolution of a family of algorithms for computing scalar products between series of the theory of D-finite symmetric functions. I will also describe their application to the computation of differential equations for the generating functions of various classes of regular graphs and generalizations. This culminates with a recent proof of a conjecture on the enumeration of vertex-labeled graphs with allowed degrees 3 and 1 and one more vertex than edges. This is based on joint past and ongoing works with Hadrien Brochet, Hui Hwang, Manuel Kauers, Pierre Lairez, Marni Mishna, and Bruno Salvy.