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Differential elimination ideals and spectral curves by Sonia Rueda

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Abstract. Commuting pairs of ordinary differential operators have been related to plane algebraic curves at least since the work of Burchnall and Chaundy a century ago. This talk is devoted to the revision of some classical results, using now a differential algebra framework and, oriented to the development of algorithms based in the computation of differential resultants. The new concept of Burchnall-Chaundy ideal of a commuting pair will be presented, as the ideal of all constant coefficient bivariate polynomials satisfied by the pair. This prime ideal will be proved equal to the radical of a differential elimination ideal and the defining ideal of a plane algebraic curve, the spectral curve of a commuting pair. We are motivated by the development of a Picard-Vessiot theory for spectral problems, in the case of algebro-geometric ordinary differential operator, which are intrinsically linked to the study of integrable hierarchies.