1057-35-41   **Emma Previato*** (`ep@bu.edu`), Department of Mathematics and Statistics, Boston, MA.
        Isomonodromy and Integrability.

The property of having no moveable critical points for an Ordinary Differential Equation (Painlevé property) was linked with integrable systems via theta functions in the 19th century, and more recently, since the 1970s, with hierarchies of integrable Partial Differential Equations (of KdV and KP type) via similarity reduction. A differential-algebraic interpretation of the Painlevé property by H. Flaschka (1980), motivated by inverse scattering, will be revisited in order to explore an explicit dictionary between the isospectral curve of the hierarchy of PDEs and the isomonodromy curve, branched at the regular-singular points of the ODE. R. Fuchs (1906) connected the isomonodromy property and the absence of moveable critical points for second-order equations with four singularities, using the Legendre operator which acts on the periods of the elliptic curve. Picard-Fuchs equations for the periods of a hyperelliptic curve have been expressed recently in terms of special functions, specifically the Kleinian sigma function. They can be used to derive a higher-genus analog of Painlevé VI, by viewing the isomonodromy equations as systems of ODEs, following R. Garnier (1912). This is a joint project with F.W. Nijhoff. (Received December 13, 2009)