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A Talk at the 2nd ISNMP Conference

Bad Ems, 28 June to 4 July 2026

Regular Session:

Speaker: Wolfgang K. Schief (School of Mathematics and Statistics, The University of New South Wales, Sydney, Australia)

Title: *The differential geometry of the (modified$^{(2)}$) Korteweg-de Vries equation and associated Miura transformations*

Abstract: We present a framework in three-dimensional Minkowski space $\mathbb{R}^{1,2}$ which unifies the extended Dym, KdV, modified KdV and modified modified KdV equations via parallel, offset and midsurfaces. Each equation governs a class of surfaces, the members of which are foliated by geodesics of certain properties. These classes of surfaces are linked by reciprocal and Miura-type transformations. In particular, we obtain a novel geometric interpretation of the classical Miura transformation linking the KdV and mKdV equations. In total, there exist ten classes which may be associated both combinatorially and literally with the 4 vertices and 6 midpoints of the edges of a (moving) tetrahedron.