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Alex Kasman* (kasmana@cofc.edu), Department of Mathematics, College of Charleston, Charleston, SC 29464. *Rethinking the KP Hierarchy: Rank One Operators and Rank Six Quadrics.*

The KP Hierarchy is a collection of integrable nonlinear partial differential equations which grew out of the study of the famous KdV equation and its soliton solutions. By appropriate reductions one can derive from it many important wave equations of mathematical physics (such as the Sine-Gordon and nonlinear Schrödinger equations), integrable particle systems (such as the Calogero-Moser and Ruijsenaars-Schneider systems). The complete description of this system in terms of the geometry of a Grassmannian manifold by M. Sato is therefore important as well as beautiful. This talk will summarize recent joint work with M. Gekhtman, T. Shiota, K. Pedings and A. Reiszl that generalizes the Sato construction and thereby reveals hidden connections. Specifically, we will see two new theorems, one of which explains the frequent appearance of “rank one conditions” in integrable systems and the other explains the significance of rank six quadrics in bosonization. (Received June 01, 2007)