

1079-37-434

Emma Previato* (ep@bu.edu), Department of Mathematics and Statistics, Boston University,
Boston, MA 02215-2411. *Sigma-function solutions of the Toda lattice.*

Klein generalized Weierstrass' σ to higher-genus curves; his construction was recently extended by V.M. Buchstaber, V.Z. Enolskii and D. Leykin. The resulting σ -function is associated to the Riemann theta function ϑ with the Riemann vector of characteristics, and has the advantage of being invariant under the modular group and expandable in weighted (by Weierstrass gaps) abelian variables which correspond to hyperosculating directions to the curve embedded in the Jacobian. These expansions allow us to prove addition formulas, which we use on a hyperelliptic curve to derive the Toda hierarchy. This gives us an algebraic version of the periodicity condition, as well as a dictionary between the Toda lattice and the (generalized) Poncelet theorem of projective geometry (namely, the billiard in an ellipsoid). This is joint work with Y. Kodama and S. Matsutani. (Received January 18, 2012)