Nonlinear Sciences > Exactly Solvable and Integrable Systems

Mutation-Periodic Quivers, Integrable Maps and Associated Poisson Algebras

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We consider a class of map, recently derived in the context of cluster mutation. In this paper we start with a brief review of the quiver context, but then move onto a discussion of a related Poisson bracket, along with the Poisson algebra of a special family of functions associated with these maps. A bi-Hamiltonian structure is derived and used to construct a sequence of Poisson commuting functions and hence show complete integrability. Canonical coordinates are derived, with the map now being a canonical transformation with a sequence of commuting invariant functions. Compatibility of a pair of these functions gives rise to Liouville's equation and the map plays the role of a B\"acklund transformation.

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