

SIDE 14.2

SIDE

Symmetries and Integrability
of Difference Equations

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Kahan-Poisson Maps

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Content :

The Kahan discretization of a Lotka-Volterra system leads to a rational map parametrized by the step size. When this map is Poisson with respect to the quadratic Poisson structure of the Lotka-Volterra system we say that this system has the Kahan-Poisson property. There is a well known family of Lotka-Volterra systems having the Kahan-Poisson property. Their underlying graph has n vertices $1, 2, \dots, n$ and an arc from i to j precisely when $i < j$. We prove that, modulo permutation of the variables and clonings, these are the only Lotka-Volterra systems having the Kahan-Poisson property.

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