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# Kontsevich graph $\gamma_3$-flow of Nambu-Poisson brackets: triviality established in 2D, 3D, and now, in 4D

Kontsevich constructed a map from suitable cocycles in the graph complex to infinitesimal deformations of Poisson bivectors. Are such deformations trivial, meaning, do they amount to a change of coordinates along a vector field? We examine this question for Nambu-Poisson brackets deformed by the tetrahedron $\gamma_3$, the smallest nontrivial graph cocycle in the Kontsevich graph complex.

We use Kontsevich's graph calculus, in which directed graphs encode differential formulas on $\mathbb{R}^d$. In particular, we use dimension-specific micro-graphs, in which each vertex represents an element of the Nambu-Poisson bracket.

The (non)trivialisation problem gives us a sequence of overdetermined inhomogeneous linear algebraic systems on the coefficients of micro-graphs over $\mathbb{R}^d$, for $d \geq 2$. We use the SageMath package *gcaops* for computations. For a chosen good graph, namely the tetrahedron $\gamma_3$, Kontsevich knew that the linear system is solvable for $d = 2$ (1996). In 2020, Buring and Kiselev proved that the linear system is solvable for $d = 3$. Building on these discoveries, we now establish that for the $\gamma_3$-flow, the linear system is solvable for $d = 4$.

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