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Integrable systems on the dual of nilpotent Lie subalgebras and T-Poisson cluster structures

Let $\mathfrak{g}$ be a semisimple Lie algebra and $\mathfrak{g} = \mathfrak{n} \oplus \mathfrak{h} \oplus \mathfrak{n}_-$ a triangular decomposition. Motivated by a construction of Kostant-Lipsman-Wolf, we construct an integrable system on the dual space of $\mathfrak{n}_-$ equipped with the Kirillov-Kostant Poisson structure. The Bott-Samelson coordinates on the open Bruhat cell (equipped with the standard Poisson structure) makes it into a symmetric Poisson CGL extension, hence giving rise to a T-Poisson cluster structure on it. Our integrable system is obtained from the initial cluster by taking the lowest degree terms of the initial cluster variables. We conjecture that mutation of clusters gives rise to mutation of integrable systems. This is joint work in progress with Yanpeng Li and Jiang-Hua Lu.