On Generic Bases for Cluster Algebras

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This is a report on joint work with B. Leclerc and J. Schroeer.

Let A be a cluster algebra of geometric type with skew-symmetric principal part, and (Q,W) a quiver with generic potential for this situation which is Jacobi finite. Denote by Jac(Q,W) the corresponding Jacobian algebra.

We call an irreduzible component of a representation variety of Jac(Q,W) strongly reduced, if in an open subset the codimenson of the orbits coincides with the generic value of the E-invariant. A bit simplifying, we call the values of the Caldero-Chapoton-Palu map on such components generic CC-functions. In particular, all cluster monomials are generic CC-function. Plamondon showed, that the set of generic CC- functions is invariant under mutations of (Q,W).

We conjecture, that the CC-functions form a basis of A. This is true for cluster algebras which are coordinate rings of unipotent cells. In this case, the generic basis can be identified with the dual semicanonical basis.
As a consequence the conjecture also holds for acyclic cluster algebras with trivial coefficients. For surface cluster algebras we can prove at least linear independence, and we expect that the generic basis coincides with one of the bases constructed by Musiker-Schiffler-Williams.