A criterion for homogeneous potentials to be 3-Calabi-Yau

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Among the homogeneous potentials w of degree $N+1$ in n variables, it is an open problem to find precisely which of the w's are 3-Calabi-Yau, although several examples are known. In this talk, I shall explain a necessary and sufficient condition for this to hold when the algebra A defined by the potential w is N-Koszul of global dimension 3. As an application, it is possible to study skew polynomial algebras over noncommutative quadrics and to recover two families of 3-Calabi-Yau potentials which have recently appeared in the literature ([1], [3], [4]).

This is a joint work with Roland Berger [2].

References

[1] R. Berger, A. Pichereau, *Calabi-Yau algebras viewed as deformations of Poisson algebras.* `arXiv:1107.4472v2`. To appear in Algebr. Represent. Th.

[2] R. Berger, A. Solotar, *A criterion for homogeneous potentials to be 3-Calabi-Yau.* `arXiv:1203.3029`

[3] S. P. Smith, *A 3-Calabi-Yau algebra with G_2 symmetry constructed from the octonions.* `arXiv:1104.3824v1`

[4] M. Suárez-Alvarez, *3-Calabi-Yau algebras from Steiner triple systems.* preprint May 2011.