8th International Conference on Symmetries and Integrability of Difference Equations (SIDE8) **June 22–28, 2008**
8e *Conférence internationale "Symétrie et intégrabilité des équations aux différences"* (SIDE8) **22–28 juin, 2008**

Characterizing singular curves in parametrized families of biquadratics

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Abstract

We consider families of biquadratic curves with coordinates x and y and coefficients depending on arbitrarily many complex parameters. Such families arise, for example, as the invariant curves for planar integrable maps. We consider the problem of how to find the singular curves in a parametrized family, the number and location of singular points lying on any given singular curve and the nature of the geometry of these curves. This results in a complete classification of singular biquadratics, achieved with the use of various algebraic methods including discriminants.

Some of the above results have appeared recently in: J. Pettigrew and J. A. G. Roberts, J. Phys. A: Math. Theor. **41** (2008) 115203 [and IOP Select].