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Degenerations of Plane Sextics

I will discuss recent joint work with V. Alexeev, in which we classify degenerate plane sextics having a certain class of singularities that is natural from the standpoint of the minimal model program. I will then show that this classification extends to the setting where we not only allow the sextic curve to degenerate, but also allow the base space to degenerate to a quartic cone.

This classification has a nice combinatorial description, in terms of subdiagrams of a certain Coxeter diagram. This suggests the existence of a close relationship between two compactifications of the moduli space of K3 surfaces of degree two: one defined by the minimal model program and the other given as a toric blow-up of the Baily-Borel compactification defined by a Coxeter diagram.