Smooth limits of plane curves and Markov numbers

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Abstract: When can we guarantee that smooth proper limits of plane curves are still plane curves? Said a different way — When is the locus of degree d plane curves closed in the (open) moduli space of smooth genus g curves? It is relatively easy to see that if d¿1, then d must be prime. Interestingly, this is not sufficient – Griffin constructed explicit families of quintic plane curves with a smooth limit that is not a quintic plane curve. In this talk we propose the following conjecture: Smooth proper limits of plane curves of degree d are always planar if d is prime and d is not a Markov number. We discuss the motivation and evidence for this conjecture which come from Hacking and Prokhorov’s work on Q-Gorenstein limits of the projective plane.

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