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*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  $d \geq 1$ , 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  $\mathbb{Q}$ -Gorenstein limits of the projective plane.

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