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*Multiple orthogonal polynomials and the number  $\pi$*

It is well known that  $\pi$  is an irrational number (and transcendental), but it is still not known how well it can be approximated by rational numbers. Last year Zeilberger and Zudilin (2020) found the best upper bound so far: the measure of irrationality of  $\pi$  is bounded from above by  $7.103205334137$ . They improved an earlier upper bound of Salikhov from 2008, and before him the best upper bound was obtained by Hata (1993). These upper bounds were obtained by analyzing certain integrals of rational functions over contours in the complex plane. In my talk I will show that these integrals are closely related to an Hermite-Padé approximation problem for a pair of Markov functions. We will investigate this Hermite-Padé approximation in some detail, in particular the corresponding multiple orthogonal polynomials, and we do the required asymptotic analysis using the steepest descent method.