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Jonathan Novak* (jnovak@math.mit.edu), Massachusetts Institute of Technology, 77
Massachusetts Avenue, Building 2, Office 339, Cambridge, MA 02139. *Monotone Hurwitz numbers
and the HCIZ integral.*

An old conjecture due to A. Matytsin claims that, under suitable hypotheses, the logarithm of the Harish-Chandra-Itzykson-Zuber integral admits a large N asymptotic expansion in powers of N^{-2} . Although this is analogous to the well-known topological expansion of Hermitian matrix models, Matytsin did not conjecture any interpretation, topological or otherwise, for the coefficients in his conjectural expansion.

I will present joint work with Ian Goulden and Mathieu Guay-Paquet in which we show that, if Matytsin's conjecture holds, the coefficients must be generating functions for a desymmetrized version of Okounkov's double Hurwitz numbers, which we call "monotone double Hurwitz numbers." The combinatorial analysis of these monotone Hurwitz numbers allows us to prove that the HCIZ free energy converges uniformly on compact subsets of a complex domain for a large class of potentials of an "arithmetic" nature. This proves a conjecture of Collins, Guionnet and Maurel-Segala for this class of potentials. (Received September 10, 2012)