Flow meandering down an inclined plane: experiments and analytical modeling KEITH MERTENS, VAKHTANG PUTKARADZE, Colorado State University, BJORN BIRNIR, University of California, Santa Barbara, PETER VOROBIEFF, The University of New Mexico — We present an experimental and analytical study of a stream flowing down a flat, partially wetting inclined plane. Despite the practical importance of the problem, much remains to be discovered in the theory of meandering flows. We find that meandering flow regime, unlike braiding flows and rivulets, exists when there are fluctuations in the flow rate. From first principles, we derive a dynamic model of the system which is driven by noise. The model equations are solved exactly to predict the meandering exponent to be 1/6. It is surprising that this meandering exponent also corresponds well to 0.1-0.2 exponents experimentally observed in rivers.

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