

Abstract Submitted  
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**Quantifying quantum chaos: improving the accuracy of approximations of the Earth Mover’s Distance with an adaptive grid** JESSICA JIANG, GARY FELDER, Smith College — This lightning talk presents an overview of the ongoing research with Gary Felder at Smith College in quantum chaos. Quantum chaos describes the behavior of a system where two of its wavefunctions will diverge from each other at an exponential rate given an infinitesimally small difference in their initial conditions. One quantifier of the “distance” between two wavefunctions is what is known as their Earth Mover’s Distance (EMD). A calculation of the EMD treats the starting and initial functions as two sand piles and finds the least cost method of moving sand from the initial pile to the final pile. A Mathematica program was previously written to approximate the EMD using a finite set of boxes. However, the program yielded results that strayed quite far from the analytical answers. As a part of the effort of members of this research group to increase the accuracy of this calculation, I’ve worked on replacing the uniform grid currently used by the Mathematica program with an adaptively subdivided grid produced by a C++ program I wrote— QuadTree. The ultimate goal of QuadTree is to obtain answers for the EMD with increased accuracy and less computational power.

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