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Evaluating Spectral Statistics of Quantum Graphs without the Semiclassical Limit.

Quantum graphs provide a simple model of quantum mechanics in systems with complex geometry and can be used to study quantum chaos. Spectral statistics of chaotic quantum systems can be studied via periodic orbits of the system; this technique typically requires taking the semiclassical limit, which, for quantum graphs, considers a sequence of graphs of increasing size. However, we evaluate the variance of the coefficients of the quantum graph's characteristic polynomial for chaotic 4-regular quantum graphs without taking the semiclassical limit. The variance of the polynomial's n -th coefficient is completely determined by the pseudo orbits (collections of periodic orbits) with n bonds that never self-intersect, or that intersect only at crossings containing a single vertex. (Received February 26, 2021)