



Nonlinear Sciences > Chaotic Dynamics

Perturbation approach to multifractal dimensions for certain critical random matrix ensembles

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Fractal dimensions of eigenfunctions for various critical random matrix ensembles are investigated in perturbation series in the regimes of strong and weak multifractality. In both regimes we obtain expressions similar to those of the critical banded random matrix ensemble extensively discussed in the literature. For certain ensembles, the leading-order term for weak multifractality can be calculated within standard perturbation theory. For other models such a direct approach requires modifications which are briefly discussed. Our analytical formulas are in good agreement with numerical calculations.

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