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Statistics of Eigenfunctions in 1D Tight Binding Model: Distribution of Riccati Variable

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Abstract: For energy eigenfunctions in 1D tight binding model, the distribution of ratios of the nearest components (Riccati variable), denoted by f(p), gives information on their fluctuation properties. The shape of f(p) is studied numerically for three versions of the 1D tight binding model. It is shown that when perturbation is strong the shape of f(p) is usually quite close to that of the Lorentzian distribution and in the case of weak perturbation the shape of the central part of f(p) is model-dependent while the shape of tails are still close to the Lorentzian form.

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Key words: one-dimensional tight binding model, distribution of Riccati variable, Lorentzian distribution

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