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**Essential spectrum of the discrete Laplacian on a perturbed periodic graph.** (English)


Summary: We address the Laplacian on a perturbed periodic graph which might not be a periodic graph. We give a criterion for the essential spectrum of the Laplacian on the perturbed graph to include that on the unperturbed graph. This criterion is applicable to a wide class of graphs obtained by a non-compact perturbation such as adding or removing infinitely many vertices and edges. Using this criterion, we demonstrate how to determine the spectra of cone-like graphs, the upper-half plane, and graphs obtained from $\mathbb{Z}^2$ by randomly adding vertices.

**MSC:**

- 05C50 Graphs and linear algebra (matrices, eigenvalues, etc.)
- 05C63 Infinite graphs
- 05C80 Random graphs (graph-theoretic aspects)

**Keywords:**

infinite graph; essential spectrum; perturbation theory; discrete Laplacian; pendant; random graph

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**References:**


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