SPECTRAL GAPS FOR THE PERIODIC DISCRETE AND METRIC GRAPHS

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ABSTRACT. Motivated by results of periodic Schroedinger operators and of Laplacians on Riemannian coverings we analyze the spectrum of periodic discrete and metric graphs. We discuss first the notion of Laplacians for discrete and metric graphs and mention some spectral relations between these operators. We localize the spectrum of the Laplacians within certain bands and give sufficient conditions for the existence of spectral gaps. For this we will need a bracketing procedure for eigenvalues on a fundamental domain of the periodic structure. We conclude mentioning some examples where both, the discrete and the quantum graph, have spectral gaps.

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