

# Bled'11 - 7th Slovenian International Conference on Graph Theory

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## Eigenvalue estimates for discrete Laplace operators on graphs

### Content :

In this talk, I will present new eigenvalue estimates for discrete Laplace operators on graphs such as the normalized graph Laplace operator or the usual combinatorial graph Laplace operator. As is well known, the smallest eigenvalue of discrete Laplace operators on graphs can be controlled by the Cheeger constant. I will establish a dual construction that controls the largest eigenvalue from above and below. Moreover, I will introduce the concept of the neighborhood graph in the case of the normalized graph Laplacian. This conceptually new approach will be used to derive further eigenvalue estimates that improve the Cheeger estimate for certain graphs. In particular, this approach allows for the control of non-extremal eigenvalues. As applications of such spectral estimates, I will study the convergence rate of random walks on graphs.

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