

# Maximum and antimaximum principles: beyond the first eigenvalue

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Consider the Dirichlet problem

$$-\Delta u = \mu u + f \text{ in } \Omega, \quad u = 0 \text{ on } \partial\Omega,$$

with  $\Omega$  a smooth bounded domain in  $\mathbb{R}^N$ . The well-known maximum and antimaximum principles give informations on the sign of the solution  $u$  when the parameter  $\mu$  varies near the first eigenvalue  $\lambda_1$  of the corresponding homogenous problem. Our purpose in this talk is to introduce an analogue of these two principles when  $\mu$  varies near a higher eigenvalue  $\lambda_k$ . Nodal domains play a central role in our study, as well as, in some cases, the Payne conjecture relative to the nodal line of a second eigenfunction in the plane. (Joint work with J. Fleckinger and F. de Thélin from Toulouse, France).