1. Eigenvalues for the domain regular3

Regular polygon with 3 sides.

Adaptive finite element method of degree 2 with 102483 triangles.

1.1. Geometric quantities (perimeter L and constants g_i).

All quantities evaluated using boundary integral for a very fine mesh. For g_i we use geometric representations from Lemma 6.2.

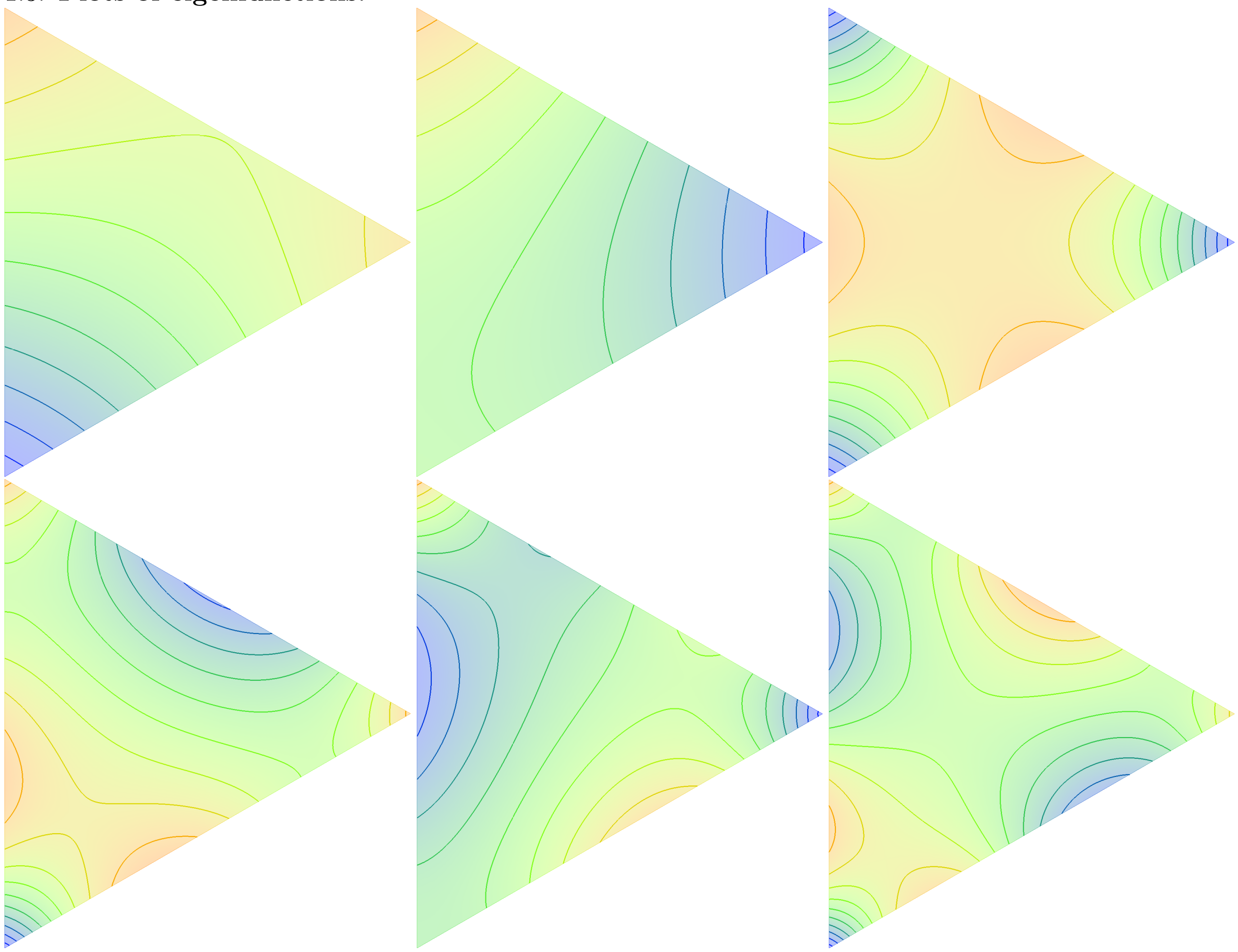
$$L = 5.19615242271 \quad g_0 = 1.65398668627 \quad g_1 = 1.20919957616 \quad g = 1.41421356237$$

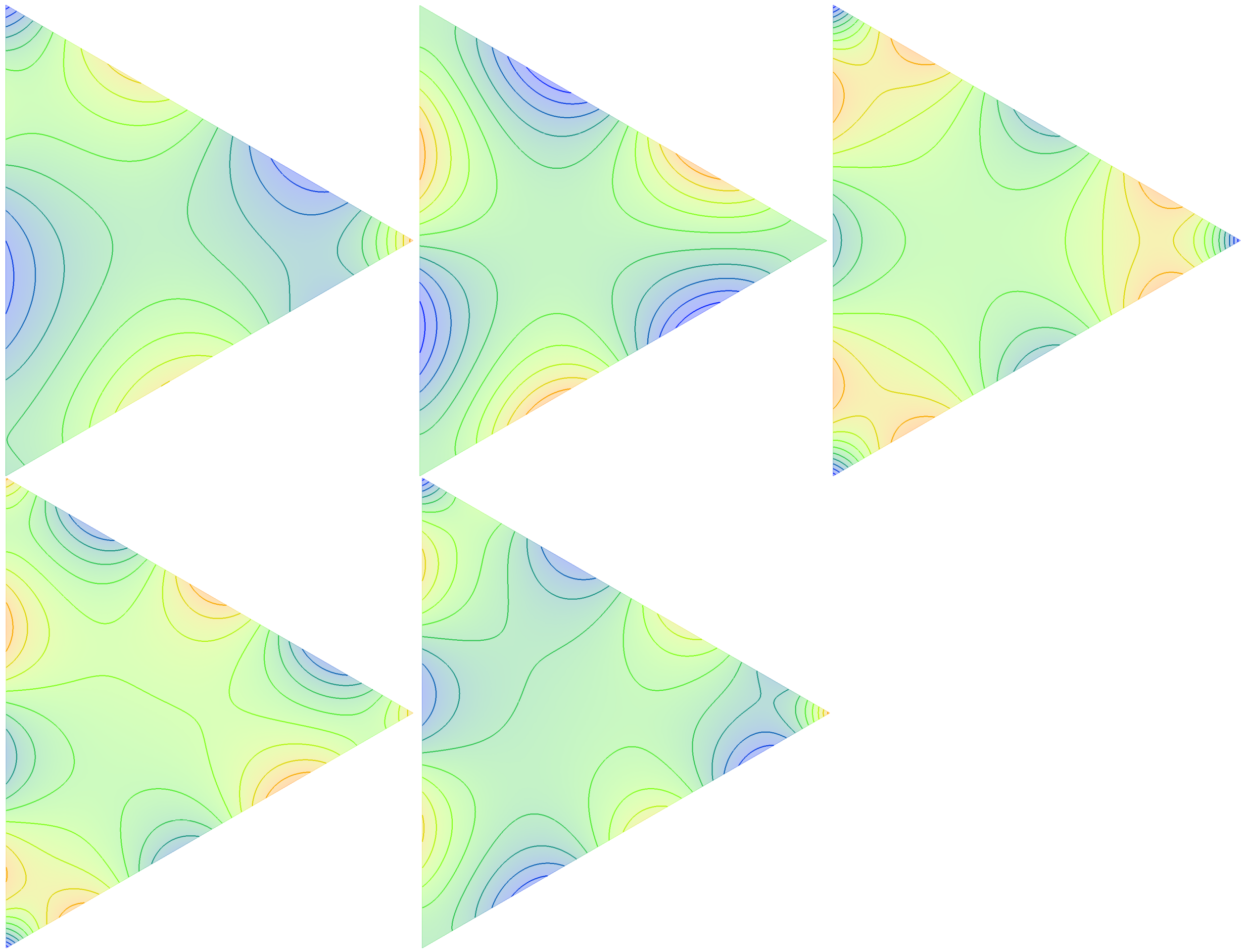
1.2. Eigenvalues.

Upper bounds are obtained by plugging numerical eigenfunctions into the Rayleigh quotient. Numbers in parentheses are numerical eigenvalues of the discrete problem. Finally ρ_i are the rescaled sums $(\sigma_1 + \cdots + \sigma_n)L$ on the domain divided by the same quantity on the disk.

$\sigma_1 \leq 0.745255581583$	(0.745255581509)	$\rho_1 = 0.616321404902$
$\sigma_2 \leq 0.745255581582$	(0.745255581516)	$\rho_2 = 0.616321404901$
$\sigma_3 \leq 2.00000000047$	(2.00000000041)	$\rho_3 = 0.721657374115$
$\sigma_4 \leq 2.96461226702$	(2.96461226697)	$\rho_4 = 0.889724017709$
$\sigma_5 \leq 2.9646122671$	(2.96461226704)	$\rho_5 = 0.865562079568$
$\sigma_6 \leq 4.25001553014$	(4.25001553018)	$\rho_6 = 0.942066105646$
$\sigma_7 \leq 4.25001553085$	(4.2500155308)	$\rho_7 = 0.926220488748$
$\sigma_8 \leq 5.43734793977$	(5.43734793972)	$\rho_8 = 0.965808918523$
$\sigma_9 \leq 5.43734795703$	(5.437347957)	$\rho_9 = 0.952513157409$
$\sigma_{10} \leq 6.65145469747$	(6.65145469755)	$\rho_{10} = 0.977117923072$
$\sigma_{11} \leq 6.65145470135$	(6.65145470132)	$\rho_{11} = 0.967062401454$

1.3. **Plots of eigenfunctions.**





1.4. **Sizes of mesh triangles and list of other parameters.**

Initial polygon: 3 sides. Adaptive: try to find 4 eigenfunctions, use at most None. Refine to at least 400000 triangles.

Sizes of mesh triangles after adaptive refinement (blue - small):