The pdf-version of this posting is available at `http://www.tn-home.de/Tobias/Mathe/040922.pdf`

In the following, I call an eigenfunction of the Laplacian Δ as *main eigenfunction* if it corresponds to the eigenvalue with smallest absolute value.

– The question in rough words:

Is there a main eigenfunction of the two-dimensional Laplacian which is continuously dependent on the domain?

– The more precise question:

Let G be some bounded domain of $\mathbf{R}^2$ with smooth boundary and let $\Phi_p : G \to G_p := \Phi_p(G)$ be a family of diffeomorphisms smoothly parameterised by $p \in (0,1)$. Thereby, each G_p shall be bounded.

Is there for each $p \in (0,1)$ a main eigenfunction ϕ_p of the Laplacian Δ on G_p such that the family $(\phi_p)_{p\in(0,1)}$ is continuously parameterised by $p \in (0,1)$???

I would be thankful for any useful comment on this question.

With best regards,

Tobias Nähring