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Radially projected finite elements

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*Review text:*

The authors developed and analyzed a new method for an exact discretization of the spheroidal domains and for a construction of finite element spaces on such domains. Such method is based on a radial projection mapping defined on the ball into the cube in any space dimensions. The new method is applied on the Laplace–Beltrami equation and an eigenvalue problem posed on the sphere. The convergence order of the method is one in  $H^1$ -norm and then by duality argument is two in  $L^2$ -norm when the elements are linear in the box. So, the order of the method is optimal because it coincides with that when the domain is polyhedral and meshed with triangular elements.

In the end of the paper, the authors presented some numerical experiments which illustrate the effectiveness and characteristics of the method.

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