

# Rellich type inequalities in domains of the Euclidean space

Avkhadiev F.

*Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia*

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## Abstract

© 2016, Allerton Press, Inc. For smooth functions supported in a domain of the Euclidean space we investigate two Rellich type inequalities with weights which are powers of the distance function. We prove that for an arbitrary plane domain there exist positive Rellich constants in these inequalities if and only if the boundary of the domain is a uniformly perfect set. Moreover, we obtain explicit estimates of constants in function of geometric domain characteristics. Also, we find sharp constants in these Rellich type inequalities for all non-convex domains of dimension  $d \geq 2$  provided that the domains satisfy the exterior sphere condition with certain restriction on the radius of spheres.

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## Keywords

distance function, non-convex domain, Rellich type inequality, uniformly perfect set