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Svitlana Mayboroda* (svitlana@math.purdue.edu), Department of Mathematics, Purdue University, 150 N. University Street, West Lafayette, IN 47907. *Properties of the biharmonic functions: Hadamard's conjecture, regularity of the Green function and Wiener criterion.*

In 1908 Hadamard conjectured that the biharmonic Green function must be positive. Later on, several counterexamples to Hadamard's conjecture have been found and a variety of upper estimates were obtained in sufficiently smooth domains. However, the behavior of the Green function in general domains was not well-understood until recently.

In a joint work with V. Maz'ya we derive sharp pointwise estimates for the biharmonic and, more generally, polyharmonic Green function in arbitrary domains. Furthermore, we introduce the higher order capacity and establish an analogue of the Wiener criterion describing the precise correlation between the geometry of the domain and the regularity of the solutions to the polyharmonic equation. (Received August 28, 2009)