Hausdorff measures, and an inequality due to Maz'ya

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The subject of the talk is Maz'ya's inequality

$$\|u\|_{L_q(\Omega)} \le c\left(\int_\Omega |\nabla u(x)|\,\mathrm{d}x + \int_{\partial\Omega} |u|\,\mathrm{d}\mathcal{H}_{n-1}\right)$$

($\Omega \subseteq \mathbb{R}^n$ bounded open, $\mathcal{H}_{n-1}(\partial\Omega) < \infty$, $q = \frac{n}{n-1}$, $u \in C(\overline{\Omega}) \cap W_1^1(\Omega)$). This inequality is closely related to the isoperimetric inequality and to the Sobolev inequality; we will comment on the relations between these inequalities. An ingredient of our proof of Maz'ya's inequality is the approximation for integrals of continuous functions with respect to a Hausdorff measure $\mathcal{H}_d$ by suitable "Riemann sums".

The talk is a report on joint work with H. Vogt.