

Some isoperimetric inequalities with respect to monomial weights

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Abstract. In this talk a class of isoperimetric problems on \mathbb{R}_+^2 with respect to monomial weights is presented. Let α and β be real numbers that satisfy certain conditions. We show that, among all smooth sets Ω in \mathbb{R}_+^2 with fixed weighted measure $\iint_{\Omega} y^{\beta} dx dy$, the weighted perimeter $\int_{\partial\Omega} y^{\alpha} ds$ achieves its minimum for a smooth set which is symmetric w.r.t. to the y -axis, and is explicitly given. Our results also imply an estimate of a weighted Cheeger constant and a sharp bound for eigenvalues of some nonlinear problems.

The results are joint work with A. Alvino, F. Brock, F. Chiacchio, A. Mercaldo and M.R. Posteraro.