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Some Explicit Examples of Minimizers for the Irrigation Problem

We construct some examples of explicit solutions to the problem

$$\min_{\gamma} \int_{\Omega} d_{\gamma}(x)\, dx$$

where the minimum is over all connected compact sets $\gamma \subset \overline{\Omega} \subset \mathbb{R}^2$ of prescribed one-dimensional Hausdorff measure. More precisely we show that, if γ is a $C^{1,1}$ curve of length l with curvature bounded by $1/R$, $l \leq \pi R$ and $\varepsilon \leq R$, then γ is a solution to the above problem with Ω being the ε-neighbourhood of γ. In particular, $C^{1,1}$ regularity is optimal for this problem.