

THE HEAT CONTENT OF POLYGONAL DOMAINS

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Let $D \subset \mathbb{R}^2$ be a bounded set with polygonal boundary ∂D . We impose an initial temperature condition on $\mathbb{R}^2 \setminus \partial D$ and can also impose boundary conditions on the edges of ∂D , such as a Dirichlet (cooling) boundary condition.

In such a setting, it is natural to ask: how much heat is left inside D at time t ? This quantity is the heat content of D . For small time, it is possible to derive asymptotic expansions for the heat content of D that depend upon the geometry of D and of ∂D .

We first review some of the previously known results for the small-time heat content asymptotics of D with certain initial conditions and boundary conditions. We then present new results for the case where D is contained in a larger set with polygonal boundary on which a Neumann (insulating) boundary condition is imposed.

This is based on joint work with Sam Farrington.