Gilkey, Peter (1-OR)

**Heat content asymptotics. (English. English summary)**


This survey lists coefficients in the $t \downarrow 0$ asymptotic expansion of the heat content in various circumstances.

The standard heat content of a Riemannian manifold $M$ with boundary is the integral $\beta(t) = \int_M u(t, x) \, dx$, where $u$ solves the heat equation $u_t = \Delta u$ with initial condition $\varphi \equiv 1$ and specified boundary conditions. For the Dirichlet case $\beta(t) \sim \beta_0 + \beta_1 t^{1/2} + \beta_2 t + \cdots$, where up to universal positive constants $\beta_0, \beta_1, \beta_2$ are, respectively, the volume of $M$, minus the volume of $\partial M$, and the trace of the second fundamental form of $\partial M$ in $M$. Formulae for some higher $\beta_i$ are known and given. (Let $k(t, x, y)$ be the heat kernel on $M$. The heat content $\beta = \int \int k(t, x, y) \, dx \, dy$ is to be distinguished from the better known heat trace $\alpha = \int k(t, x, x) \, dx$.)

The current paper addresses more general cases including operators of Laplace type on vector bundles, mixed boundary conditions, inhomogeneities and nonminimal operators.

{For the entire collection see MR 2000e:58001.}

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