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Moduli spaces of meromorphic functions and determinant of Laplacian

The Hurwitz space is the moduli space of pairs (X, f), where X is a compact Riemann surface and f is a meromorphic function on X. We consider the Laplace operator on the flat non-compact singular Riemannian manifold $(X, |df|^2)$. We define a regularized relative determinant of the Laplace operator and obtain an explicit expression for the determinant in terms of the basic objects on the underlying Riemann surface (the prime form, theta-functions, the canonical meromorphic bidifferential) and the divisor of the meromorphic differential df. A surgery formula of the type of Burghelea-Friedlander-Kappeler (for the relative determinant of the Laplace operator on singular flat surfaces with conical and Euclidean ends) allows to close the conical/Euclidean ends and thus reduces the proof of explicit expression for the relative determinant to the proof of a similar expression for the zeta-regularized determinant of Laplace operator on the (compact) manifold with closed ends. The talk is based on a joint work with Alexey Kokotov and Luc Hillairet.