

1027-58-34

Klaus Kirsten* (klaus_kirsten@baylor.edu), Department of Mathematics, Baylor University, Waco, TX 76798. *Functional determinants for separable partial differential operators.*

Functional determinants of partial differential operators are of great importance in many applications in mathematical physics. For example they arise in semiclassical approximations in quantum mechanics and quantum field theory. As a preparation for the higher dimensional considerations we will first consider second order self-adjoint elliptic systems of differential operators on the one-dimensional interval. For general boundary conditions, a contour integral method for the calculation of the related functional determinants is provided. Afterwards partial differential operators are analyzed for cases where eigenfunctions can be obtained using separation of variables. Cartesian and polar coordinates serve as examples. In particular we perform a dimensional reduction by which results for partial differential operators are given explicitly in terms of a series of determinants of an associated ordinary differential operator. (Received January 26, 2007)