

Ten physical applications of spectral zeta functions

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Abstrak

Zeta-function regularization is a powerful method in perturbation theory, and this book is a comprehensive guide for the student of this subject. Everything is explained in detail, in particular the mathematical difficulties and tricky points, and several applications are given to show how the procedure works in practice, for example in the Casimir effect, gravity and string theory, high-temperature phase transition, topological symmetry breaking, and non-commutative spacetime. The formulae, some of which are new, can be directly applied in creating physically meaningful, accurate numerical calculations. The book acts both as a basic introduction and a collection of exercises for those who want to apply this regularization procedure in practice.