Essential spectrum of partial differential operators and limit operators

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We present a new approach to study of essential spectrums of elliptic pseudodifferential operators. We associate to an elliptic pseudodifferential operator a family of limit operators and prove that the essential spectrum of elliptic pseudodifferential operator, considered as unbounded on the space $L^2(\mathbf{R}^N)$, is the union of spectrums of limit operators. As a rule, the limit operators have a more simple structure than the original operator such that we are able find the spectrums of limit operators.

As applications of this approach we consider the essential spectrum of multiparticle Schrödinger operators, Klein-Gordon and Dirac operators.