Recent development in extension theory. Applications to Schrödinger operators with point interactions.

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A new approach to the extension theory of symmetric operators and its applications to boundary value problems for differential operators will be discussed. This approach is based on a concept of boundary triplet. The main ingredient of this approach is the abstract version of Green formula. In the framework of this approach one parameterizes the set of selfadjoint, dissipative and other types of extensions in terms of abstract boundary conditions. For differential operators it leads to a description directly in terms of boundary conditions (avoiding von Neumann formulas). The main analytical tool in this approach is abstract Weyl function. It allows one to investigate type of spectra of selfadjoint extensions.

Applications to the investigation of point, absolutely continuous and singular spectra will be discussed. Applications to spectral theory of $1D$ and $3D$ Schrödinger operators with point interactions will be discussed in detail.