Title: The spectral theory of the Neumann--Poincaré operator on convex domains

The Neumann--Poincaré operator (abbreviated by NP) is a boundary integral operator naturally arising when solving classical boundary value problems using layer potentials. If the boundary of the domain, on which the NP operator is defined, is $C^{1\alpha}$ smooth, then the NP operator is compact. Thus, the Fredholm integral equation, which appears when solving Dirichlet or Neumann problems, can be solved using the Fredholm index theory.

Regarding spectral properties of the NP operator, the NP spectrum depends heavily on geometry of the surface (or the curve) on which the operator is defined. Our main purpose here is to deduce some structural properties of the NP spectrum on convex domains. Then we discuss relationships among the NP spectrum and PDEs.