

On Plemelj's question regarding the invertibility of the Neumann-Poincare operator

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In the introduction of his influential 1911 monograph J. Plemelj writes that "one of the most important tasks of modern Potential Theory is to explore the invertibility of boundary singular integral equations arising from single and double layer potentials." In this talk I will report on recent progress in identifying conditions of a purely algebraic nature (that turn out to be equivalent to the Shapiro-Lopatinsky condition) for a given real, constant coefficient, homogeneous, weakly elliptic 2×2 system in the plane which are necessary and sufficient for the invertibility of the double and single layer potential operators associated with said system in non-smooth planar domains.

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