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On the system of Beltrami type and its applications

A number of inverse problems for the transport equation can be interpreted as a boundary value problems for an analogue of an elliptic system of Beltrami type $\mathbf{u}_{\overline{z}} - A\mathbf{u}_z + \mu(z,\overline{z})B\mathbf{u} = 0$. Here $\mathbf{u}(z,\overline{z})$ is a function of the complex variables $z, \overline{z}$ with values in some complex Banach space X; A and B are linear operators in X; $\mu(z,\overline{z})$ is a scalar function, defined on a bounded domain Ω in the complex plane $\mathbf{C}$. In contrast to the classical condition $\|A\| < 1$ we consider the case $\|A\| \leq 1$ and under some complementary conditions a corresponding theory of A-analytic functions ($\mu \equiv 0$) is developed. An analogue of integral Cauchy's formula and an analogue of Sokhotskyi's formulas are obtained. Applications to emission tomography problems are discussed. Part of this results is joint work with A. L. Bukhgeim.