ON GLOBAL STABILITY FOR INVERSE STURM-LIOUVILLE PROBLEMS

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We study inverse problems for the Sturm-Liouville operator

$$Ly = -y'' + q(x)y$$

on the finite interval $[0, \pi]$. The main attention is paid to classical inverse problems, when the spectral data are defined by two spectra or by the spectrum and wave numbers. We construct special Hilbert spaces (denoted by $\hat{l}_2^\theta$) where the spectral data are placed in when the potential q runs through the Sobolev spaces W_2^θ, $\theta \geqslant -1$. The case $\theta = 0$ corresponds to the classical case. First we prove the following result: A map $F : q \to \eta$ acting from W_2^θ to $\hat{l}_2^\theta$ (here η is the vector in $\hat{l}_2^\theta$ characterizing the spectral data which correspond to q) is weakly nonlinear, i.e. a compact perturbation of a linear map. The main result (which is new in classical case also) roughly can be formulated as follows: if η and $\tilde{\eta}$ are the vectors of spectral data corresponding to the potentials q and $\tilde{q}$ then the difference $q - \tilde{q}$ in the norm of W_2^θ can be uniformly estimated through the difference $\eta - \tilde{\eta}$ in the norm $\hat{l}_2^\theta$.

The talk is based on joint works with A.Savchuk.