Nonlinear optics equation in the quarterplane

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The nonlinear optics equation

$$[D,g_t]-[\widehat{D},g_x]=\Big[[D,g],[\widehat{D},g]\Big],$$

where $g=g^*$ is an $m\times m$ matrix function, $g_{kk}\equiv 0$,

$$D=\mathrm{diag}\{d_1,d_2,\dots,d_m\}>0,\quad d_k\neq d_j\quad (k\neq j),$$
$$\widehat{D}=\mathrm{diag}\{\widehat{d}_1,\widehat{d}_2,\dots,\widehat{d}_m\}>0,\quad \widehat{d}_k\neq \widehat{d}_j\quad (k\neq j).$$

is treated in this talk. We consider the evolution of the Weyl function of the auxiliary linear system $Y_x(x,t,z)=\big(izD-[D,g(x,t)]\big)Y(x,t,z)$, solve the corresponding inverse problem and obtain solution of the nonlinear optics equation in the quarterplane. Sufficient conditions when the procedure is well-defined and the solution is unique are given. The talk is based on the paper [1] and references therein.

[1] A. L. SAKHNOVICH: Weyl functions, inverse problem and special solutions for the system auxiliary to the nonlinear optics equation. *Inverse Problems* **24** (2008) 025026.