IDENTIFICATION PROBLEMS FOR LINEAR DIFFERENTIAL AND INTEGRO-DIFFERENTIAL EQUATIONS

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The talk will be concerned with some of the following topics:

1. recovering nonlinear terms in scalar and vector conservation laws in one space variable using the method of characteristics;

2. recovering the conductivity coefficient dependent only on time and a memory kernel in parabolic integro-differential equations;

3. recovering *scalar* memory kernels depending on time and invariant under space rotations in integro-differential equations related to thermal bodies with spherical or non-spherical symmetries;

4. recovering some *scalar* differentiable relaxation kernels invariant under rotations around an axis in the integro-differential Maxwell equations for dispersive media with cylindrical symmetries;

5. recovering the *scalar* differentiable relaxation kernel h, via Analytic Semigroup Theory, in second-order linear integro-differential operator equations of the form

$$u''(t) - \int_0^t h(t-s)Au(s)\,\mathrm{d}s = f(t), \qquad t \in [0, +\infty),$$

   both in the *regular case*, i.e. $h(0) \neq 0$, and in the *singular one*, i.e. $h(0) = 0$;