

Title: Well-posedness and regularity theory for abstract integrodifferential equations in interpolation scales and applications

Abstract: In this talk, we present some of our recent results on the initial value problem associated with the abstract integrodifferential equation

$$u'(t) = \int_0^t g(t-s)Au(s)ds + f(t, u(t)) \quad t > 0,$$

with critical or subcritical nonlinearity f in interpolation scales. We prove local-in-time existence, uniqueness, continuation, and blow-up alternative of the ϵ -regular solution that satisfies a specific condition of controlled behavior at $t = 0$. Then, we apply the theory to the Navier-Stokes problem with hereditary viscosity and initial data in the scale of fractional power spaces associated with the Stokes operator; and to reaction-diffusion problems with super-linear and gradient nonlinearities, and initial data in Lebesgue and Besov spaces, respectively.