On a parabolic operator of dissipative systems

Monica De Angelis
Univ. of Naples "Federico II", Dep. Math. Appl. "R.Caccioppoli", Via Claudio n.21, 80125, Naples, Italy.

The integro-differential operator \( \mathcal{L} \)

\[
\mathcal{L}u \equiv u_t - \varepsilon u_{xx} + au + b \int_0^t e^{-\beta(t-\tau)} u(x, \tau) \, d\tau = F(x, t, u)
\]  (1)

which models several phenomena in viscoelasticity, biology and superconductivity is considered. Initial-boundary value problems with Neumann, Dirichlet and mixed boundary are analyzed and an asymptotic analysis is achieved. As example of equivalence among \( \mathcal{L} \) and various reaction-diffusion systems, the Fitzhugh Nagumo model is considered and results are applied both in the linear case and in the non linear one.