DECAY ESTIMATES IN EVOLUTION EQUATIONS WITH CLASSICAL AND FRACTIONAL TIME-DERIVATIVES

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Using energy methods, we prove some power-law and exponential decay estimates for classical and nonlocal evolutionary equations. The results obtained are framed into a general setting, which comprise, among the others, equations involving both standard and Caputo time-derivative, and diffusion operators as the classic and fractional Laplacian, complex valued magnetic operators, fractional porous media equations and nonlocal Kirchhoff operators. Both local and fractional space diffusion are taken into account, possibly in a nonlinear setting. The different quantitative behaviours, which distinguish polynomial decays from exponential ones, depend heavily on the structure of the time-derivative involved in the equation. This work was done in collaboration with Enrico Valdinoci [1].

References

[1] E. Affili and E. Valdinoci. Decay estimates for evolution equations with classical and fractional time-derivatives. *Journal of Differential Equations*, 266(7):4027–4060, 2019.

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