

Spectrum, stability and local eventual positivity

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It seems that the phenomenon of *local eventual positivity* was first investigated by Gazzola and Grunau in 2008, in the context of the biharmonic heat equation $u_t + \Delta^2 u = 0$ on Euclidean space \mathbb{R}^n . Since then, various authors have shown that local eventual positivity is typical of solutions to many higher-order linear and semilinear evolution equations on \mathbb{R}^n . From a more abstract perspective, Daners, Glück and Kennedy laid the foundations of the theory of eventually positive semigroups on Banach lattices in 2015/6. Arora in 2021 was able to extend the operator-theoretic framework to treat locally eventually positive semigroups.

However, there is a gap in the current theory: most of the abstract results require fairly strong conditions on the spectrum of the semigroup generator, which are typically not satisfied when one considers differential operators acting on unbounded domains. The goal of this talk is to present some of my recent work which investigates what can be done with locally eventually positive semigroups under minimal assumptions on the spectrum. Thus we take a perspective that is complementary to the existing literature: we will see that mild regularity conditions together with local eventual positivity imply nice spectral properties.