Approaching Evolution Equations via Strongly Continuous Semigroups Elisabetta Mangino

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Evolutionary Partial Differential Equations are a remarkable field of investigation with a large spectra of applications. One of the most effective approaches relies on translating the issue in an abstract Cauchy problem on a suitably chosen infinite-dimensional Banach space X:

(1)
$$\begin{cases} u'(t) = Au(t) \\ u(t_0) = u_0 \in X \end{cases}$$

where A is an operator acting on X. If A is linear, a solution of (1) would arise once we are able to give meaning to the exponential e^{tA} . The theory of semigroups of bounded operator comes exactly to the aid this question, allowing to investigate well-posedness, regularity and asymptotic stability for the original evolutionary problem.

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The course will present the main features of this now-a-days classical theory, illustrating its effectiveness in dealing with linear problems and also with some nonlinear evolution problems arising from reaction-diffusion equations.