

# Non-autonomous Functional Differential Equations and Applications

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The course will focus on the applications of non-autonomous dynamical systems techniques to the study of non-autonomous and recurrent functional differential equations which are monotone for different orderings.

In particular, after introducing the basic concepts in the theory of skew-product semiflows and the appropriate topological dynamics techniques, we will study the long-term behavior of relatively compact trajectories by describing the structure of minimal and omega-limit sets, as well as the attractors. We will include the cases of finite delay, infinite delay and the neutral case. Special attention will be also paid to the almost periodic case, in which the presence of almost automorphic dynamics will be analyzed.

Finally, we will show the applications of these techniques to the study of neural networks, compartmental systems or certain biochemical control circuit models.

## References

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- [2] V. Muñoz-Villarragut, S. Novo, R. Obaya, Neutral functional differential equations with applications to compartmental systems, *SIAM J. Math. Anal.* **40** No. 3 (2008) 1003–1028.
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- [4] G.R. Sell, *Topological Dynamics and Ordinary Differential Equations*, Van Nostrand-Reinhold, London, 1971.
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