Summary

The purpose of the Ph.D. Thesis "Dynamics of strongly continuous semigroups associated to certain differential equations" is to analyse, from the point of view of functional analysis, the dynamics of solutions of linear evolution equations. These solutions can be represented by a strongly continuous semigroup on an infinite-dimensional Banach space. The aim of our research is to provide global conditions for chaos, in the sense of Devaney, and stability properties of strongly continuous semigroups which are solutions of linear evolution equations.

This work is composed of three principal chapters. Chapter 0 is introductory and defines basic terminology and notation used, besides presenting the basic results that we will use throughout this thesis. Chapters 1 and 2 describe, in general way, a strongly continuous semigroup induced by a semiflow in Lebesgue and Sobolev spaces which is a solution of a linear first order partial differential equation. Moreover, some characterizations of the main dynamical properties, including hypercyclicity, mixing, weakly mixing, chaos and stability are given along these chapters. Chapter 3 describes the dynamical properties of a difference equation based on the so-called birth-and-death model and analyses the conditions previously proven for this model improving them by employing a different strategy.

The goal of this thesis is to characterize dynamical properties of these kind of strongly continuous semigroups in a general way, whenever possible, and to extend these results to another spaces. Along this memory, these findings are compared with the previous ones given by many authors in recent years.