

A Taste of Applications

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## Prelude

Applications of semigroups cover an immense range, in areas such as Partial Differential Equations, Probability Theory, Stochastic Processes, Mathematical Physics, etc. There are excellent books exposing these subjects, some of which are listed in the bibliography. We thought that going seriously in this direction would take us too much afield, with a great amount of needed prerequisites, with wasteful overlapping with other well-known textbooks and monographs, and with a divergence from the original purpose of this book as a sort of synthesis between semigroup theory and spectral theory. Our purpose therefore in this “part” is to give a mere glimpse at some results obtained by using methods of the theory of semigroups, chosen by two criteria: the tools of semigroup theory are essentially used in their derivation, and the author was involved in their establishment.

In Section A, the results of Section D in Part I on analytic families of semigroups are applied to analytic one-parameter families of evolution systems in the “temporally inhomogeneous” case (the case of an analytic family of semigroups is the special case of a “temporally homogeneous” system). In Section B, the results of Section F in Part I on boundary values of regular semigroups are applied to obtain results on the similarity of operators within the family  $S + \zeta V$  ( $\zeta \in \mathbb{C}$ ), when  $iS$  generates a  $C_0$ -group and  $V \in B(X)$  is an “ $S$ -Volterra” operator embedded in a regular semigroup.