Part III
Implementation and Applications

The numerical methods presented in Part II for linear DDEs (2.4) are adapted in this last part of the book to system (2.8). The latter describes with sufficient generality the class of DDEs of interest in most applications, with a structure that is the most general and suitable to be treated numerically.

Chapter 7 of this part explains in detail how the methods are implemented in MATLAB. System (2.8) is taken here as a prototype, given its generality from the numerical point of view.

Nevertheless, even more freedom is left to the user if a slightly modified formulation is considered, especially when dealing with models having varying or uncertain parameters. Chapter 8 is based on this user's point of view. There we explain how to use the MATLAB codes for analyzing a benchmark set of case studies, as well as real-life applications.

One formulation or the other, the aim of this part is in guiding the interested reader to the understanding and application of the proposed algorithms.

Eventually, let us emphasize once more that models coming from applications can be either originally linear (autonomous or periodic) or can be obtained by linearizing nonlinear systems at specific solutions (equilibria or periodic). As a consequence, the analysis of (2.8) through the computation of the characteristic roots (autonomous case) or of the characteristic multipliers (periodic case) provide information, respectively, on the global stability of the zero solution for the linear problem itself or on the local stability of a specific solution for nonlinear ones linearized at the latter.