Erbe, L. H.; **Kong, Qingkai**; **Zhang, B. G.**
Oscillation theory for functional differential equations. (English) Zbl 0821.34067
Pure and Applied Mathematics, Marcel Dekker. 190. New York: Marcel Dekker, Inc. vii, 496 p. (1994).

This book provides many new interesting results from the oscillatory and nonoscillatory theory of functional differential equations (FDE), mainly from FDE of neutral type. The book is divided into seven chapters. The first chapter consists of preliminary, which is essential for the next chapters. Chapter 2 is devoted to various techniques used in the asymptotic theory of differential equations with deviating arguments. Further it presents some criteria for oscillations and results in the distribution of zeros of oscillatory solutions of delay differential equations of first order. Chapter 3 presents a systematic study of the oscillation theory of first-order neutral differential equation (NDE). There are given oscillation criteria for the existence of positive solutions of NDEs and results of linearized oscillations. In Chapter 4 the authors investigate the existence of oscillatory solution of delay differential equations of second order. Further there are given some oscillation criteria and the classification of nonoscillatory solutions of NDEs of second order. Chapter 5 deals with NDEs of odd order and even order separately. It extends some results from chapters 3 and 4. In the last section of this chapter the behaviour of solutions of even order of NDEs of unstable type is investigated in detail. Chapter 6 is devoted to the oscillatory properties of linear systems of NDEs and to the existence of nonoscillatory solutions of nonlinear systems of NDEs. Chapter 7 concerns the existence and uniqueness, the existence of (positive) solutions of boundary value problems for second-order functional differential equations.

The book concentrates mainly on: finding conditions for oscillation of solutions of FDEs and for existence of one oscillatory (nonoscillatory) solutions of NDEs; comparison results and asymptotic classification of nonoscillatory solutions of NDEs. Special attention is paid to NDEs with nonlinear neutral term.

This excellent book contains many new contributions of the authors and of other mathematicians, mainly their colleagues. This monograph can be used as a textbook for graduate students working in the theory of ordinary differential equations and it will be a valuable source for research in this field.

Reviewer: P.Marušiak (Žilina)

MSC:

34K99	Functional-differential equations (including equations with delayed, advanced or state-dependent argument)
34-02	Research exposition (monographs, survey articles) pertaining to ordinary differential equations
34C10	Oscillation theory, zeros, disconjugacy and comparison theory for ordinary differential equations
34K40	Neutral functional-differential equations

Keywords:

oscillatory and nonoscillatory theory of functional differential equations; neutral type; differential equations with deviating arguments