

Uniqueness Implies Existence and Uniqueness Conditions for Boundary Value Problems for 4th Order Differential Equations

Nasiba Albatni

University of Dayton

Abstract: In studies in disconjugacy, it has been established for many years that under suitable hypotheses, the uniqueness of solutions of n -point conjugate boundary value problems on an interval (a, b) implies the existence of solutions for any conjugate point boundary value problem on (a, b) for an n th order differential equation. In this talk, we consider a fourth order ordinary differential equation and we consider a family of boundary value problems different than and related to the conjugate boundary value problems. In particular, we shall assume the uniqueness of solutions of 4 – point right focal type boundary value problems and show the existence of solutions of a broad family of two, three and four point boundary value problems. The primary tool is an unpublished precompactness condition for families of solutions of ordinary differential equations. The precompactness condition is due to Jackson and Schrader.