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Research Details :

Research Title	: *The Generalized Quasilinearization Method for Second Order Three-Point Mixed Boundary Value Problems*
	طريقة شبه خطية معممة لمسائل قيم حدية ذات ارتباط ثلاثي النقط من الرتبة الثانية
Descriptipn	: The method of generalized quasilinearization generates a monotone iteration scheme whose iterates converge uniformly and quadratically to a unique solution of the problem at hand. In fact, this method is the generalization of classical method of quasilinearization and does not require the nonlinear function involved in the problem to be convex or concave. In this thesis, we discuss a three-point boundary value problem for nonlinear second order differential equations with mixed linear and nonlinear boundary conditions. Multipoint boundary value problems, which are also known as nonlocal boundary value problems, refer to a different family of boundary conditions in the study of disconjugacy theory and have been addressed by several authors. We apply the generalized quasilinearization method to develop a monotone sequence of approximate solutions converging uniformly and quadratically to a unique solution of the nonlinear three-point mixed problem. It has been shown that the nonlinearities in the boundary conditions can be handled on the pattern similar to the one dealing with nonlinearities in the differential equation. As a second problem, it has been proved that it is possible to construct a monotone sequence that converges to the unique solution of the problem with the order of convergence under additional regularity conditions on the nonlinear function involved in the problem
Research Type	: Master
Research Year	: 2006
Publisher	: KAAU
Supervisor	: د/ بشير بن أحمد فقير
Added Date	: Wednesday, June 11, 2008

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