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**T G Bhaskar**, Department of Mathematics, Indian Institute of Technology, Delhi, Hauz Khas, 110 016 New Delhi, India, and **Farzana A McRae\*** (mcr@cu.edu), Department of Mathematics, Catholic University of America, Washington, DC 22064. *Monotone iterative techniques for nonlinear problems involving the difference of two monotone functions*. Preliminary report.

We prove a fundamental theorem concerning the existence of coupled maximal and minimal solutions of differential equations involving the difference of two monotone functions. Besides the relevance of such problems in mathematical biology, this treatment has several implications to the theory of monotone iterative techniques. (Received October 02, 2000)