

## Existence and Ulam-Hyers stability results for coupled fixed point problems

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### Abstract

The classical Banach contraction principle is a very useful tool in non-linear analysis with many applications to operatorial equations, fractal theory, optimization theory and other topics. Banach contraction principle was extended for singlevalued contraction on spaces endowed with vector-valued metrics by Perov in 1964, while the case of multivalued contractions is treated by A. Petruşel in 2004.

From the applications point of view, it is sometimes useful to consider a more general notion, namely coupled fixed points. The concept of coupled fixed point for nonlinear operators was considered for the first time by D. Guo and V. Lakshmikantham in connection with the quasisolutions of an initial value problem for ordinary differential equation. The theory of coupled fixed points in ordered metric space was later discussed by T. Gana Bhaskar and V. Lakshmikantham in 2006.

The purpose of this work is to present Gnana Bhaskar-Lakshmikantham type theorems for the coupled fixed point of a pair of mixed monotone singlevalued operators in ordered metric spaces. The approach is based on Perov type fixed point theorem in spaces endowed with vector-valued metrics. The Ulam-Hyers stability of the coupled fixed point equation is also discussed.

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