RANDOM FIXED POINTS AND INVARIANT RANDOM APPROXIMATION IN NON-CONVEX DOMAINS

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Abstract
Random fixed point results in the framework of a compact and weakly compact domain of a \( q \)-normed spaces which is not necessary star-shaped have been obtained in the present work. Invariant random approximation results have also been determined as an application. In this way, a random version of invariant approximation results due to R. N. Mukherjee and T. Som (*A note on an application of a fixed point theorem in approximation theory*, Indian J. Pure Appl. Math., 16(3), 243–244, 1985) and S. P. Singh (*An application of a fixed point theorem to approximation theory*, J. Approx. Theory 25, 89–90, 1979) have been given.

Keywords: Contractive jointly continuous family, Random best approximation, Random fixed point, Random operator.

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1. Introduction

Probabilistic functional analysis is an important mathematical discipline because of its applications to probabilistic models in applied problems. Random operator theory is needed for the study of various classes of random equations. The theory of random fixed point theorems was initiated by the Prague probabilistic school in the 1950s. The interest in this subject was enhanced after the publication of the survey paper by Bharucha Reid [5]. Random fixed point theory has received much attention in recent years (see, e.g. [2, 18, 16, 17, 21]).

Interesting and valuable results obtained by applying various random fixed point theorems have appeared in the literature of approximation theory. In this direction, some

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