RANDOM FIXED POINT THEOREMS FOR
*-NONEXPANSIVE OPERATORS IN FRÉCHET SPACES

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Abstract. Some random fixed point theorems for nonexpansive and *-nonexpansive random operators defined on convex and starshaped sets in a Fréchet space are proved. Our work extends recent results of Beg and Shahzad and Tan and Yaun to noncontinuous multivalued random operators, sets analogue to an earlier result of Itoh and provides a random version of a deterministic fixed point theorem due to Singh and Chen.

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 study of random fixed point theorems was initiated by the Prague school of probabilists in the 1950s. The generalization of these theorems from self maps to nonself maps has gained tremendous importance after the papers by Beg [2], Beg and Shahzad [3, 4], Lin [10], Tan and Yaun [17], and Xu [22]. In particular, Beg [2], Tan and Yaun [17] and Xu [22] have studied continuous multivalued random maps including condensing maps and hemicompact maps. In this paper we study the random fixed point theory of noncontinuous multivalued random maps. A random fixed point theorem for a nonexpansive operator defined on a starshaped subset of a Fréchet space X is established in Theorem 2.3. As an application of this result in Theorem 2.7 a significantly general fixed point theorem for *-nonexpansive (noncontinuous) multivalued random operators defined on a suitable subset