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COMPARISON THEOREMS ON REGULAR POINTS FOR MULTI-DIMENSIONAL MARKOV PROCESSES OF TRANSIENT TYPE[1)]

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§ 1. Introduction

The study of regular points for the Dirichlet problem has a long history. The probabilistic approach to regular points is originated by Doob [2] and [3] for Brownian motion and the heat process. The extension to general Markov processes is discussed in Dynkin [4] and [5]. They also clarified the relation between the fine topology and regular points.

Regular points are by definition reflected in the behaviour of sample paths of Markov processes. Further the inclusion relation of collections of regular points for open sets determines the strength and the weakness of fine topologies between two processes. Hence it is meaningful to compare the collections of regular points for compact or open sets between two Markov processes apart from the Dirichlet problem.

Our aim of this article is to give a certain answer to the following problem. *Given two Markov processes. Can we give any characteristic quantities which determine whether a point is regular or not for one process provided that it is regular for the other process?* This type of problem has been studied for a certain class of uniformly elliptic differential operators of second order in $R^n (n \geqq 3)$ by many authors. They have shown that regular points for operators of such a class are the same as those for the Laplace operator by proving that there exist Green functions with singularity r^{2-n}. The relation between singularities of Green functions and regular points plays main roles in this article, too. Here we note that certain answer to the above problem has been given for diffusion processes by N.V. Krylov [17], [18], [19] and Markov processes having Green functions with monotone and isotropic singularities by the author [13], [14], [15].

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