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On Some Stable Maps and Compact Lie Groups

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Dedicated to Professor Nobuo Shimada on his 60th birthday

§ 0. Introduction

In [5] Becker and Gottlieb defined the transfer which is a stable map from B_+ to E_+ where $E \to B$ is a differentiable fibre bundle whose fibre is a compact manifold. They used this map to solve some topological problems. In this paper, we define a transfer-type stable map between same dimensional manifolds with some conditions and study their properties. The typical example is related to the compact Lie group and its maximal rank subgroup. As an application, we can prove Becker-Segal type theorem for SU the infinite special unitary group.

This paper is constructed as follows:

In Section 1, we define a stable map associated with a differentiable map between same dimensional manifolds with a condition related to the tangent bundles and prove some pull back and evaluation formulas.

In Section 2, we construct the main example which is related to the compact Lie group G and its maximal rank subgroup H. We obtain a stable map

$$t(i)\colon G_+ \longrightarrow G \times_H H_{c+}$$

where H_c is the space H whose H-action is given by the adjoint action, with some nice properties. (For details, see Section 2.)

In Section 3, we give two applications. One is related to the homotopy-normality of the maximal rank subgroup of a compact Lie group and the other is a Becker-Segal type theorem for SU.

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§ 1. Transfer

Let $f\colon M \to N$ be a smooth map between closed manifolds M and N

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