# REMARK ON THE DUAL EHP SEQUENCE

YASUTOSHI NOMURA

Dedicated to Professor K. NOSHIRO for his 60th birthday

In this note we will improve the dual EHP sequence which has been constructed in [6] by showing that that can be extended by one term. We then observe that this can be used to deduce a result which has been announced by T. Ganea in [4]. As another application we will establish a theorem which asserts that, under certain conditions, a principal fibration with a loop-space as fibre is principally equivalent to the one induced by some map.

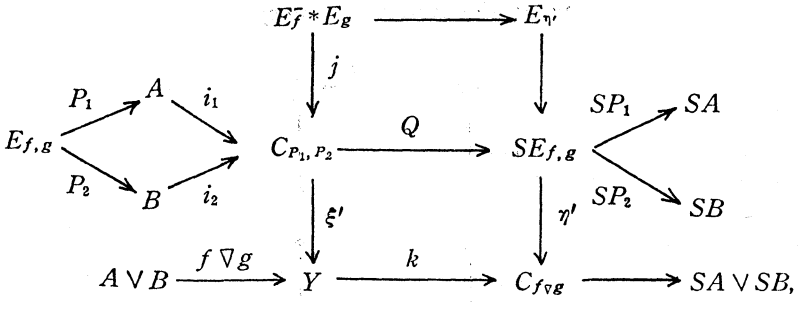
Throughout this note, we make use of the notations and results described in [5] and [6] without specific reference. In particular, $E_{f,g}$ and $E_g$ denote the mapping track of a triad $A \xrightarrow{f} Y \xleftarrow{g} B$ and the fibre of $g$ respectively. Dually, $C_{f,g}$ and $C_g$ denote the mapping cylinder of a cotriad $A \xleftarrow{f} X \xrightarrow{g} B$ and the cofibre of $g$ respectively. We denote the loop and (reduced) suspension functor by $\Omega$ and $S$ respectively. We use $\pi(X, Y)$ to denote the set of based homotopy classes of based maps $X \to Y$, but we will permit ourselves not to distinguish between a map and the homotopy class it represents.

## 1. The dual EHP sequence

For a triad $A \xrightarrow{f} Y \xleftarrow{g} B$, we introduce in [6] the maps

$$\xi' : C_{P_1,P_2} \to Y \text{ and } \eta' : SE_{f,g} \to C_{f\nabla g}$$

which make the following diagram homotopy-commutative:




Received June 22, 1966.