

The integral cohomology ring of the symmetric space $EVII$

By

Takashi WATANABE

(Received April 22, 1974)

§ 0. Introduction

The purpose of this paper is to determine the integral cohomology ring of $EVII$ in E. Cartan's notation which is a compact hermitian symmetric space. This completes the determination of integral cohomology rings of all compact hermitian symmetric spaces combined with the results of [7, § 16] and [12].

Throughout this paper the symbols F_4, E_6, E_7 denote compact simply connected forms of these exceptional Lie groups and $H^*(X)$ denotes the integral cohomology ring of X . We use the same notations and terminologies as in [12] without specific reference.

Then our main results are stated as follows:

Theorem A.

$$H^*(EVII) = \mathbf{Z}[u, v, w] / (s_{10}, s_{14}, s_{18})$$

where $u \in H^2, v \in H^{10}, w \in H^{18}$ and

$$s_{10} = v^2 - 2wu, \quad s_{14} = -2wv + 18wu^5 - 6vu^9 + u^{14},$$

$$s_{18} = w^2 + 20wvu^4 - 18wu^9 + 2vu^{13}.$$

Corollary B.

$$H^*(E_7/E_6) = \mathbf{Z}\{1, z_{10}, z_{18}, z_{37}, z_{45}, z_{55}\} + \mathbf{Z}_2\{z_{28}\}$$

where $1 \in H^0, z_i \in H^i$ and non-trivial relations among them are