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PL-submanifolds and homology classes of a PL-manifold II

By

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In [1] we have proved the fundamental theorem of the realization problem of homology classes by submanifolds in the *PL*-case. In the present paper we shall give some consequences. One is based on the results of Browder-Liulevicius-Peterson [2] on the homotopy types of the *PL* Thom spectrum $\boldsymbol{MPL}$, and the other on the results of Kuiper-Lashof [5] on the homotopy groups of PL_1.

We use the notations and terminologies in [1].

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1. Statements of the results

Theorem 1. *Let V^n be a closed PL-manifold of dimension n. For $k \leqq n/2$, all homology classes of $H_k(V^n, Z_2)$ can be realized by PL-submanifolds which have normal PL-microbundles.*

Theorem 2. *Let V^n be a closed PL-manifold of dimension n. All homology classes of $H_{n-1}(V^n, Z_2)$ can be rerlized by PL-submanifolds which have normal PL-microbundles.*

These results are quite parallel to those of C^∞-case in Thom [8].

2. Study of the homotopy type of Thom complexes $\mathbf{MPL}_k$

a) Preliminaries.

Let $\boldsymbol{MPL} = \{MPL_n, \mu_n; n \geqq 0\}$ be the *PL* Thom spectrum defined