Peter M. AKHMETIEV

The Kervaire Invariant of framed manifolds as the obstruction to embeddability

Abstract: Let N^{4k+2} be a closed smooth manifold, $dim(N) = 4k+2$, equipped with a stable framing Ψ_N. Let $\varphi : N^{4k+2} \looparrowright \mathbb{R}^{6k+3}$ be a smooth framed immersion in the prescribed regular homotopy class of Ψ_N. We denote by L^{2k+1} a double-point manifold of φ. A skew-framed immersion $\psi : L^{2k+1} \looparrowright \mathbb{R}^{4k+2}$ is well defined up to a regular skew-framed cobordism. Let us denote by $\Theta(\psi)$ the integer number (modulo 2) of double self-intersection points of ψ. This number depends only on the original framed manifold (N^{4k+2}, Ψ_N): $\Theta(\psi) = \Theta(N^{4k+2}, \Psi_N)$.

Main Theorem. *The integer* $\Theta(N^{4k+2}, \Psi_N) \mod 2$ *is the Kervaire invariant of the stably framed manifold* (N^{4k+2}, Ψ_N).

Theorem. *Let* N^{30} *(*M^{62}*) be a closed* 14*-connected (*30*-connected) framed manifold with Kervaire Invariant 1. Then* N^{30} *(*M^{62}*) is non-embeddable smoothly into* $\mathbb{R}^{46}$ *(into* $\mathbb{R}^{94}$*) and is embeddable smoothly into* $\mathbb{R}^{47}$ *(into* $\mathbb{R}^{95}$*).*

(Joint work with Matija Cencelj, and Dušan Repovš.)