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Comparing Heegaard splittings of non-Haken 3-manifolds. (English) Zbl 0858.57020
Topology 35, No. 4, 1005-1026 (1996).

Summary: Cerf theory can be used to compare two strongly irreducible Heegaard splittings of the same closed orientable 3-manifold. Any two splitting surfaces can be isotoped so that they intersect in a nonempty collection of curves, each of which is essential in both splitting surfaces. More generally, there are interesting isotopies of the splitting surfaces during which this intersection property is preserved. As sample applications we give new proofs of *F. Waldhausen's* theorem that Heegaard splittings of S^3 are standard [ibid. 7, 195-203 (1968; [Zbl 0157.54501](#))] and of *F. Bonahon* and *J.-P. Otal's* theorem that Heegaard splittings of lens spaces are standard [Ann. Sci. Éc. Norm. Supér., IV. Sér. 16, 451-466 (1983; [Zbl 0545.57002](#))]. We also present a solution to the stabilization problem for irreducible non-Haken 3-manifolds: If $p \leq q$ are the genera of two splittings of such a manifold, then there is a common stabilization of genus $5p + 8q - 9$.

MSC:

57N10 Topology of general 3-manifolds (MSC2010)

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Keywords:

Cerf theory; Heegaard splittings; 3-manifold; isotopies; stabilization problem; non-Haken 3-manifolds

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