

Kronheimer, Peter B.

Embedded surfaces in 4-manifolds. (English) Zbl 0746.53041
Proc. Int. Congr. Math., Kyoto/Japan 1990, Vol. I, 529-539 (1991).

[For the entire collection see [Zbl 0741.00019](#).]

The purpose of the article is to outline a “proof” of the following conjecture due to J. W. Morgan: If X is a simply-connected, oriented 4-manifold for which Donaldson’s polynomial invariants are defined and non-zero, and if Σ is a smoothly embedded, oriented 2-manifold with positive self-intersection, then the genus g of Σ satisfies $2g - 2 \geq \Sigma \cdot \Sigma$. The conjecture is known to hold for $g = 0$ or 1 . The author’s argument uses gauge theory, but with a modification; he considers connections in some auxiliary $SU(2)$ or $SO(3)$ bundle over $X \setminus \Sigma$, which have non-trivial holonomy around the small linking circles of Σ . As for “branched instantons” some essential facts are missing, the author has to fill the gap by two other conjectures.

Reviewer: [H.Reckziegel \(Köln\)](#)

MSC:

[53C40](#) Global submanifolds

[53C07](#) Special connections and metrics on vector bundles (Hermite-Einstein, Yang-Mills)

Cited in **1** Review
Cited in **5** Documents

Keywords:

[Morgan’s conjecture](#); [Donaldson’s polynomial](#); [gauge theory](#); [branched instantons](#)