

Kronheimer, P. B.; Mrowka, T. S.

The genus of embedded surfaces in the projective plane. (English) Zbl 0851.57023
Math. Res. Lett. 1, No. 6, 797-808 (1994).

This important paper gave a proof of Thom's conjecture in the case of complex projective plane CP^2 : the smallest genus of a smoothly embedded surface in CP^2 representing the degree d homology class in $H_2(CP^2)$ is $(d-1)(d-2)/2$. Being considered as one of the fundamental, unsolved, problems in four dimensional topology for a quarter of this century, the conjecture asserted that in a simply connected, 4-dimensional, complex manifold, the smallest genus of a smoothly embedded surface, representing a given homology class, is realized by that of an embedded complex curve. Before this time, the authors had already established part of this conjecture in the case of some other complex surfaces such as K3-surfaces; however the situation of complex projective plane had not been settled and had been regarded by many as the real issue. Using the work of Seiberg-Witten and in less than ten pages, the authors gave a complete proof of this important case. Since the publication of this article, numerous papers have appeared addressing other related problems in 4-dimensional manifolds by making use of the various techniques of the authors. Brilliant and full of original insight, this paper is a "must" for anyone who is interested in doing research in this area.

Reviewer: [R.Lee \(New Haven\)](#)

MSC:

- 57N13 Topology of the Euclidean 4-space, 4-manifolds (MSC2010)
- [57R57](#) Applications of global analysis to structures on manifolds
- [57R55](#) Differentiable structures in differential topology
- [57R40](#) Embeddings in differential topology
- [14J60](#) Vector bundles on surfaces and higher-dimensional varieties, and their moduli

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Keywords:

[Thom's conjecture](#); [complex projective plane](#); [embedded surface](#); [embedded complex curve](#)

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