



Fake Real Planes: exotic affine algebraic models of \mathbb{R}^2

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Résumé en anglais
We study real rational models of the euclidean affine plane \mathbb{R}^2 up to isomorphisms and up to birational diffeomorphisms. The analogous study in the compact case, that is the classification of real rational models of the real projective plane $\mathbb{R}P^2$ is well known: up to birational diffeomorphisms, $\mathbb{P}^2(\mathbb{R})$ is the only model. A fake real plane is a smooth geometrically integral surface S defined over \mathbb{R} not isomorphic to $A^2_{\mathbb{R}}$, whose real locus $S(\mathbb{R})$ is diffeomorphic to \mathbb{R}^2 and such that the complex surface $S_{\mathbb{C}}(\mathbb{C})$ has the rational homology type of $A^2\mathbb{C}$. We prove that fake planes exist by giving many examples and we tackle the question: does there exist fake planes S such that $S(\mathbb{R})$ is not birationally diffeomorphic to $A^2_{\mathbb{R}}(\mathbb{R})$?

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Liens

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