

The geometry of holomorphic and algebraic curves in
complex algebraic varieties

April 30 – May 4, 2007

Fake projective planes

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Abstract

A fake projective plane is a complex surface different from but has the same Betti numbers as the complex projective plane. It is a complex hyperbolic space form and has the smallest Euler Poincare characteristic among smooth surfaces of general type. The first example was constructed by Mumford. Later on two more examples were found by Ishida and Kato. A fourth possible one was recently proposed by Keum. *In a recent joint work with Gopal Prasad*, we showed that there are seventeen non-empty classes of fake projective planes and there can at most be four more specific classes. Higher dimensional analogues and examples were also obtained. The main purpose of the talk is to explain the joint work with Prasad and other related results such as arithmeticity of the lattices involved obtained earlier by Klingler and Yeung independently.