COMPLEX AND REAL HYPERBOLIC DISC BUNDLES OVER SURFACES

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Probably, the most simple (nontrivial) 4-manifolds M are disc bundles over orientable closed surfaces. Topologically (= smoothly), they are completely characterized by two numbers: the Euler characteristics $\chi\Sigma$ of the base Σ and the Euler number (= the intersection number of two sections) eM of the bundle.

In the case of complex hyperbolic geometry, many such manifolds can be constructed by using the 'building blocks' transversal triangles of bisectors. These blocks are fibred by discs and, in some sense, have fractional Euler numbers. In particular, a trivial bundle can be constructed in such a way. This solves an old-standing problem.

In the case of real hyperbolic geometry, similar ideas make it possible to construct in a simple way the example of Feng Luo. It provides a maximal known value $|eM/\chi\Sigma| = \frac{1}{2}$. A concept of a minimal graph of a manifold seems to be useful for constructing better examples.

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