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Complex hyperbolic surfaces and discrete groups in complex hyperbolic geometry

A complex hyperbolic surface M is a quotient of complex hyperbolic 2-space by a discrete group Γ of isometries which acts freely. Alternatively, M is a complete Kaehler 2-manifold of constant holomorphic sectional curvature -1. We prove Poincaré Polyhedron Theorem for one special class of polyhedra bounded by bisectors in complex hyperbolic space. Applications to constructing discrete groups will be presented. In particular, we construct faithful discrete representations of the surface group of genus $g > 1$ in the isometry group of complex hyperbolic 2-space which represent complex hyperbolic surfaces with odd Toledo's invariant. This gives an answer to a question stated in [1].

Reference: 1. Goldman, W., Kapovich, M., Leeb, B., Complex hyperbolic manifolds homotopy-equivalent to a Riemann surface, preprint, 1997.