Contribution ID: **38** Type: **not specified**

Patterns of Mirrors on Quasi-Platonic Surfaces

It is known that every Riemann surface of genus g can be expressed in the form $\mathbb{U}/\Omega$, where $\mathbb{U}$ is the Riemann sphere Σ, the Euclidean plane $\mathbb{C}$, or the hyperbolic plane $\mathbb{H}$, depending on whether g is 0, 1 or > 1, respectively, and Ω is a discrete group of isometries of $\mathbb{U}$.

A Riemann surface $S = \mathbb{U}/\Omega$ is \emph{quasi-Platonic} if Ω is normal in the ordinary triangle group $\Gamma[l, m, n]$. So S underlies a regular hypermap $\mathcal{H}$ of type (l, m, n). If Ω is also normal in the extended triangle group $\Gamma(l, m, n)$, then $\mathcal{H}$ is reflexible. Each reflection of $\mathcal{H}$ fixes a number of simple closed geodesics on S, which are called \emph{mirrors}. Then every mirror passes through some geometric points of $\mathcal{H}$ and these geometric points form a periodic sequence, which is called the \emph{pattern} of the mirror. By geometric points we mean the centers of the hypervertices, hyperedges and hyperfaces of $\mathcal{H}$.

In previous work David Singerman and I classified the patterns of mirrors on Platonic surfaces, which underlie regular maps, and in this work it is generalized to quasi-Platonic surfaces.

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