REPRESENTATIONS OF TRIANGLE GROUPS AND REGULAR MAPS

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A regular map is a cellularly embedded graph in a surface whose automorphism group acts regularly on the dart set of the map. If a regular map is of type $\{m, n\}$ (that is, of face length m and vertex valence n) then its automorphism group is a quotient of a triangle group $T(2, m, n) = \langle x, y;\ x^n = y^2 = (xy)^m = 1\rangle$. We will study a linear faithful representations of triangle groups in linear groups $SL_3(Z[\eta, \xi])$ where $\eta = 2\cos(\pi/m)$ and $\xi = 2\cos(\pi/n)$. In particular, we will investigate the minimal polynomials for η and ξ over Z and apply the results to constructions of regular maps.