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On triangular (D_n)-actions on p-gonal Riemann surfaces

Abstract A compact Riemann surface X of genus $g > 1$ which has a conformal automorphism ρ of prime order p such that the orbit space $X/\langle\rho\rangle$ is the Riemann sphere is called *cyclic p-gonal*. The group generated by ρ is unique in the group G of conformal automorphisms of X if $g > (p-1)^2$. We say that the action of G on X is a *triangular (D_n)-action* if G acts with a triangular signature and the quotient $G/\langle\rho\rangle$ is a dihedral group D_n for some $n \geq 2$. In this case we denote X by $X_{p,n,g}$. If n is the number of fixed points of a p-gonal automorphism ρ, then $X_{p,n,g}$ is a p-sheeted cover of the sphere ramified over the vertices of a regular n-gon and we say that $X_{p,n,g}$ is a *(p, n)-Accola-Maclachlan surface*. In particular, $X_{2,2g+2,g}$ is the original Accola-Maclachlan surface whose automorphism group has the minimum size $8(g + 1)$. A symmetry of a Riemann surface X of genus g is an antiholomorphic involution and the set of fixed points of X consists of k disjoint Jordan curves called *ovals*, where $0 \leq k \leq g + 1$. We determine, up to topological conjugacy, the full group of conformal and anticorformal automorphisms of $X_{p,n,g}$. We prove that $X_{p,n,g}$ is symmetric and any of its symmetries with fixed points has 1 or p ovals. We find these $X_{p,n,g}$ whose group of automorphisms has the minimum size and these $X_{p,n,g}$ which admit a symmetry with the maximal number of ovals. Finally, we prove that for any prime p there exists a symmetric Riemann surface whose every symmetry has p ovals, and there exists a Riemann surface with arbitrary even number of symmetries.