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RESEARCH ANNOUNCEMENTS

THE TETRAGONAL CONSTRUCTION

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1. **Preliminaries.** Let C be a nonsingular curve of genus g, and $\pi: \widetilde{C} \longrightarrow C$ an unramified double cover. The Prym variety $P(C, \widetilde{C})$ is by definition $\ker^0(Nm)$, where $Nm: J(\widetilde{C}) \longrightarrow J(C)$ is the norm map, and $\ker^0$ is the connected component of 0 in the kernel. By [M] this is a $(g-1)$-dimensional, principally polarized abelian variety. Let A_g, M_g, R_g denote, respectively, the moduli spaces of g-dimensional principally polarized abelian varieties, curves of genus g, and pairs $(C, \widetilde{C})$ as above. (R_g is a $(2^{2g}-1)$-sheeted cover of M_g.) The Prym map is the morphism

$$P = P_g: R_g \longrightarrow A_{g-1}, \qquad (C, \widetilde{C}) \mapsto P(C, \widetilde{C}).$$

It is analogous to the Jacobi map $J = J_g: M_g \longrightarrow A_g$ sending a curve to its Jacobian. The main reason for studying P is that its image in R_{g-1} is larger than that of J, hence it allows us to handle geometrically a wider class of abelian varieties than just Jacobians. For instance, P_g is dominant for $g \leqslant 6$ [W] while J_g is only dominant for $g \leqslant 3$.

The purpose of this announcement is to describe the fibers of P in the various genera. Our main tool for this is a simple-minded construction which we describe in some detail in paragraph 6. Let us use "n-gonal" (trigonal, tetragonal, etc.) to describe a pair (C, f) where $f: C \longrightarrow \mathbf{P}^1$ is a branched cover of degree n (3, 4 respectively). Briefly, our construction takes the data $(C, \widetilde{C}, f)$ where $(C, \widetilde{C}) \in R_g$ and (C, f) is tetragonal, and returns two new sets of data, $(C_0, \widetilde{C}_0, f_0)$ and $(C_1, \widetilde{C}_1, f_1)$, of the same type. This procedure is symmetric: starting with $(C_0, \widetilde{C}_0, f_0)$ we end up with $(C, \widetilde{C}, f)$ and $(C_1, \widetilde{C}_1, f_1)$. It is useful due to the following observation.

PROPOSITION 1.1. *The tetragonal construction commutes with the Prym map*:

$$P(C, \widetilde{C}) \approx P(C_0, \widetilde{C}_0) \approx P(C_1, \widetilde{C}_1).$$

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