Two-Torsion Subgroups of Jacobians of Non-Hyperelliptic Curves

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Let C be a smooth, projective and non-hyperelliptic curve of genus g, where $g = 3, 4$ or 5, over $\mathbb{Q}$ and let J be its Jacobian. Recall that J is a g-dimension abelian variety whose points can be identified with elements of the zero Picard group of C. The Mordell-Weil theorem states that for any number field L, $J(L)$ is a finitely generated group; that is, $J(L) = J(L)_{\text{tors}} \oplus \mathbb{Z}^r$, where $J(L)_{\text{tors}}$ is a finite group, the torsion subgroup, and $r \geq 0$ is the rank. In this talk I will present a method of computing the 2-torsion subgroup of J; that is the group $J[2] = \{P \in J(\overline{\mathbb{Q}}) \,|\, 2P = 0\}$, and hence the 2-torsion over any number field L.