THE 2-RANK OF THE CLASS GROUP OF
IMAGINARY BICYCLIC Biquadratic Fields

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Abstract. A formula is obtained for the rank of the 2-Sylow subgroup of the ideal class group of imaginary bicyclic biquadratic fields. This formula involves the number of primes that ramify in the field, the ranks of the 2-Sylow subgroups of the ideal class groups of the quadratic subfields and the rank of a $\mathbb{Z}_2$-matrix determined by Legendre symbols involving pairs of ramified primes. As applications, all subfields with both 2-class and class group $\mathbb{Z}_2 \times \mathbb{Z}_2$ are determined. The final results assume the completeness of D. A. Buell’s list of imaginary fields with small class numbers.

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