The Totally Real A_5 Extension of Degree 6 with Minimum Discriminant

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Abstract

We determine the totally real algebraic number field F of degree 6 with Galois group A_5 and minimum discriminant, showing that it is unique up to isomorphism and that it is generated by a root of the polynomial

$$f(t) = t^6 - 10t^4 + 7t^3 + 15t^2 - 14t + 3$$

over the rationals. We also list the fundamental units and class number of F, as well as data for several other fields that arose in our computations and that might be of interest.