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AUTOMORPHISMS AND ISOMORPHISMS OF HENSELIAN FIELDS

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We announce here some results on automorphisms and isomorphisms of formally real Henselian valued fields. Proofs and further results (including generalizations to fields which are not formally real) will appear elsewhere [**3, 4**].

1. Automorphisms. We begin by recalling two standard facts about real closed fields.

(A) The field $\mathbf{R}$ of real numbers (and indeed any Archimedean real closed field) has no nontrivial automorphisms.

(B) A real closure of a field F admits no nontrivial automorphisms fixing F.

Contrary to the impression these results might give, in general a real closed field can admit many automorphisms. One has a bijective Galois correspondence between the set of fixed fields of a real closed field K with respect to sets of automorphisms of K and the set of groups of automorphisms of K of the form $\mathrm{Aut}\,(K/F)$ for some set $F \subset K$. Can the fixed fields be characterized intrinsically? It is easy to see such a field must be algebraically and topologically closed in K. (Facts (A) and (B) above are corollaries of this observation.) We announce a partial converse.

Recall that a real closed field K admits a canonical valuation with Archimedean real closed residue class field [**1**, §4]. The order topology on K is just the valuation topology for this valuation, unless the valuation is trivial.

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