1067-03-669 **Julia F. Knight*** (knight.1@nd.edu), 255 Hurley Hall, Mathematics Department, University of Notre Dame, Notre Dame, IN 46556-5641, and **Karen Lange**. *Structures associated with real closed fields.*

Let R be a countable real closed field. A *value group* for R is a subgroup G of $(R^+, \cdot)$ with just one representative for each equivalence class under the Archimedean valuation. A *residue field* for R is a maximal Archimedean subfield k. An *integer part* is a discrete ordered subring I such that for all $x \in R$, there exists $i \in I$ with $i \leq x < i + 1$.

We showed that R has a value group that is $\Delta^0_2(R)$, and there is a residue field that is $\Pi^0_2(R)$. Both results are sharp. By a result of Mourgues and Ressayre, R has an integer part. Using their procedure, we obtain an integer part that is $\Delta^0_{\omega^\omega}(R)$. For all we know, there is a simpler procedure, yielding an integer part that is $\Delta^0_2(R)$. There is a maximal discrete ordered subring I that is $\Delta^0_2(R)$. Moniri and Marker gave examples showing that this need not be an integer part–I does not extend to a Z-ring. There is a $\Delta^0_2(R)$ ring $I \subseteq R$ such that I is a maximal Z-ring. With Paola D'Aquino, we showed that this need not be an integer part for R. We showed that there is a computable real closed field with no n-c.e. integer part for any n. (Received September 13, 2010)