1014-12-14 **Hendrik W. Lenstra Jr.***, Universiteit Leiden. *Entangled radicals, Part II.*
Let K be a field of characteristic zero, and write $\sqrt{K^*}$ for the multiplicative group of all a in an algebraic closure of K for which there is a positive integer n with $a^n \in K^*$. In Part I, the question was posed to "understand" the structure of the extension field $K(\sqrt{K^*})$ of K solely in terms of K. One may interpret this question practically in terms of computer algebra: can one, for fields K of arithmetic interest, find a way to represent the elements of $K(\sqrt{K^*})$ such that the field operations as well as equality tests may be performed efficiently? A more theoretical way of interpreting the question is in terms of Galois theory: the extension $K(\sqrt{K^*})$ is a Galois extension of K, and its Galois group may be identified with a subgroup of the group $\mathrm{Aut}_{K^*}\sqrt{K^*}$ of group automorphisms of the abelian group $\sqrt{K^*}$ that are the identity on K^*; can one say which subgroup it is? In the lecture it will be explained why these two apparently widely disparate interpretations are basically equivalent, and that an answer to the question may be given in terms of the "maximal cyclotomic" Galois group of K. (Received April 05, 2005)