1046-12-1832 **Laurel Miller-Sims*** (millerlg@math.mcmaster.ca), Department of Mathematics & Statistics, McMaster University, 1280 Main St. W, Hamilton, ON L8S 4K1, Canada. *Hilbert's Seventeenth Problem in Valued Fields.*

A generalized version of Hilbert's seventeenth problem asks for a characterization of those rational functions over the reals that, respectively, take non-negative values, positive values or vanish on a given semi-algebraic set. Valued fields are natural structures in which to formulate analogues of this question as we may replace the notions of being non-negative and positive with the notions of having non-negative and positive valuation. In particular, we study Hilbert's seventeenth problem in certain model-complete theories of valued fields. Given a valued field, possibly with additional structure such as an ordering or derivation, $(K, v, \dots)$ and a (first-order) definable subset S of K^n we find a subring A of $K(X) = K(X_1, \dots, X_n)$, depending on S and the structure on K, and an ideal B of A such that $f \in K(X)$ is integral-definite on S if and only if f is in the integral closure of A and f is infinitesimal-definite on S if and only if f is in the integral closure of B. While the results are algebraic the proofs are model-theoretic in nature. (Received September 16, 2008)