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Denis R. Hirschfeldt, Karen Lange and Richard A. Shore* (shore@math.cornell.edu),
Department of Mathematics, Malott Hall, Cornell University, Ithaca, NY 14853. *Homogeneous
Models and Weak Combinatorial Principles I*. Preliminary report.

This work has its roots in classical recursive model theory and the investigations by Goncharov and Peretyat'kin of the conditions under which a set of types over a complete decidable theory has a decidable homogeneous model realizing exactly the given set of types. We approached this problem from the viewpoint of reverse mathematics and discovered that there are several variants of the definitions of both homogeneity and of the effective conditions on the family of types that while classically equivalent are not so in RCA_0 . Instead one needs $\text{B}\Sigma_2$ or $\text{I}\Sigma_2$ to smooth the way. We also found an analogous result for when a complete decidable theory has a decidable model realizing exactly a given set of types.

Our next step was to search for natural combinatorial principles that would capture the effective constructions required.

This talk will describe the relevant definitions and results including the reverse mathematical one and so set the stage for the next talk by Denis Hirschfeldt which will describe the new combinatorial construction principles and how they power the effective model theory and interact with induction schemes in the setting of reverse mathematics. (Received September 23, 2012)