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Binarity and convexity rank in $\aleph_0$–categorical weakly o-minimal theories

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This talk concerns the notion of *weak o-minimality* originally and deeply studied by D. Macpherson, D. Marker and C. Steinhorn [TAMS, 2000]. Real closed fields with a proper convex valuation ring provide an important example of weakly o-minimal structures. A. Pillay and C. Steinhorn have described all $\aleph_0$–categorical o-minimal theories [TAMS, 1986]. Their description implies binarity for these theories. Here we present some results on $\aleph_0$–categorical weakly o-minimal theories, and discuss some connections between two notions: binarity and convexity rank. Recall that convexity rank for a formula with one free variable was introduced by the speaker in [JSL, 1998]. In particular, a theory has convexity rank 1 if there is no definable (with parameters) equivalence relation with infinitely many infinite convex classes. It is obvious an o-minimal theory has convexity rank 1. Firstly, we give a description of $\aleph_0$–categorical binary weakly o-minimal theories of convexity rank 1 [A & L, 2005]. Further, we present some technique on 2–formulas which was originally introduced by B.S. Baizhanov. At last, by using this technique we obtain a criterion for binarity of $\aleph_0$–categorical weakly o-minimal theories in terms of convexity rank (the main result of the talk).