A model-theoretic method for establishing the k-variable property is given in the paper. To study the k-variable property is important from the temporal logic point of view. A first-order theory satisfies the k-variable property if every formula is, under the theory, equivalent to a formula with at most k bound variables. The method used in the paper to establish the k-variable property is based on a variant of the Ehrenfeucht-Fraïssé game. Results in the literature for linear orders are unified and simplified by the method. Some new k-variable properties for various theories of bounded-degree trees are established. These results imply the existence of a finite basis for the first-order expressible temporal connectives over tree models of bounded degree.

Reviewer: J. Šefránek

MSC:
03B70 Logic in computer science
03C30 Other model constructions
03B45 Modal logic (including the logic of norms)
03C13 Model theory of finite structures
68Q55 Semantics in the theory of computing

Keywords:
k-variable property; temporal logic; Ehrenfeucht-Fraïssé game; bounded-degree trees; tree models

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