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Companionability Characterization for the Expansion of an O-minimal Theory by a Dense Subgroup.

Let T be a complete o-minimal theory expanding the theory of groups, and let \mathcal{L} be the language in which T admits quantifier elimination. Let $T_{\mathcal{G}}$ be the expansion of T by a unary predicate \mathcal{G} that picks out a dense and codense subgroup. I provide a full characterization for when $T_{\mathcal{G}}$ has a model companion. This result is motivated by questions raised in recent works concerning preservation results in model companions for some neostability properties. I restrict my attention to the o-minimal setting because this permits a full and geometric characterization for companionability. I supply examples both in which the predicate is an additive subgroup, and where it is a multiplicative subgroup. I conclude with a brief discussion of neostability properties, and give examples that illustrate the lack of preservation for properties such as strong, NIP, and NTP_2 , though there are also examples for which the model companion preserves NTP_2 . (Received September 15, 2019)