

The aim of this paper is to gain a deeper understanding of the somewhat complex relations that hold among several concepts about the automorphisms of an ordered relational structure. In particular, interest centers on conditions that are equivalent to the translations (automorphisms with no fixed points) being a homogeneous, Archimedean ordered group under asymptotic order. As Alper's (1987) generalization of Narens (1981a, b) showed, these properties are equivalent to the relational structure having a numerical representation whose scale type lies between, but not excluding, the ration and interval types. The major result of the present paper (Theorem 9) is that the following weaker necessary conditions are also sufficient: the asymptotic order induced on the automorphisms is connected, the structure is homogeneous, and the translations are Archimedean. Theorem 10 establishes that the Alper-Narens sufficient condition, which assumed Dedekind completeness, homogeneity, and infinite uniqueness, is easily proved to be a special case Theorem 9.