1154-06-1386 **Nick Galatos*** (ngalatos@du.edu), Department of Mathematics, Univ. of Denver, C.M. Knudson Hall, Room 300 2390 S. York St., Denver, CO 80210, and **George Metcalfe** and **Almudena Colacito**. *Inverse-free reducts of lattice-ordered groups.*

Lattice-ordered groups (ℓ-groups) have inverse-free reducts that are distributive as lattices and multiplication distributes over both meet and join (totally distributive ℓ-monoids). It is known that in the abelian case, the inverse-free subreducts satisfy more equations than the above and they are actually not finitely based. We prove that in the general case of all ℓ-groups, the inverse-free subreducts are exactly the totally distributive ℓ-monoids. Also, for the intermediate case of subreducts of semilinear ℓ-groups (subdirect products of chains) we show that special equations hold. We further provide an equational axiomatization for the variety of all semilinear totally distributive ℓ-monoids.

A proof theory for ℓ-groups exist but it is complicated, relying on hypersequents. On the other hand a tame proof-theoretic calculus exists for totally-ordered ℓ-monoids. We provide a syntactic transformation from an ℓ-group identity to an inverse-free identity so that they are both equi-valid in ℓ-groups; so the existing calculus for totally distributive ℓ-monoids can be used for deciding ℓ-group equations. The translation can be seen as an application of the density rule in proof theory. (Received September 15, 2019)