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George Metcalfe* (george.metcalfe@vanderbilt.edu), Mathematics Department, 1326 Stevenson Center, Vanderbilt University, Nashville, TN 37240. *Density and Ordered Algebraic Structures*.

Proof theory provides an algorithmic way of representing and reasoning about ordered algebraic structures. In this work, we show how proof theory can be used to solve an algebraic problem important in the context of fuzzy logic; namely, that certain varieties are generated by their dense chains. The strategy consists essentially of two distinct parts. First, an equivalence is established between validity in dense chains of the variety, and derivability in a proof calculus for the variety extended with a rule capturing density. It is then shown that applications of the density rule can be eliminated from proofs in the calculus. An important consequence of these results for fuzzy logic is that certain varieties are generated by their members whose lattice reduct is the real unit interval $[0,1]$. (Received September 06, 2006)