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*Subgroup lattices of finite solvable groups.*

I will discuss joint projects with Patricia Hersh and Russ Woodroffe. We obtain a lower bound for the connectivity of the order complex of a finite lattice (with top and bottom elements removed) in terms of the maximum length of a chain of modular elements in this lattice. We determine when this bound is tight. Using the ideas and results from this investigation, we find a new characterization of finite solvable groups that involves only the structure of their subgroup lattices: A finite group is solvable if and only if its subgroup lattice contains two chains of the same length, one maximal and the other consisting entirely of modular elements. We show also that if  $L$  is the subgroup lattice of a finite group  $G$ , then the bound mentioned above is tight if and only if  $G$  is solvable and every normal subgroup of  $G$  has a complement. (Received August 10, 2010)