Abstract

Combinatorial structures called candelabra systems can be used in recursive constructions to build Steiner 3-designs. We introduce a new closure operation on natural numbers involving candelabra systems. This new closure operation makes it possible to generalize various constructions for Steiner 3-designs and to create new infinite families of Steiner 2-designs and 3-designs. We provide an independent proof for Wilson’s ”product theorem” for Steiner 3-designs. We also construct new group divisible designs of strength 2 and 3.