

# **Definitive Screening Designs: A New Class of $D$ -Efficient Three-level Factorial Designs**

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## **Abstract**

Definitive screening (DS) designs, first proposed by Jones and Nachtsheim (2011), draw numerous attentions from the researches of designs of experiments due to its good design properties and run-size economy. This paper investigates in the structure of DS designs and suggests a theoretically-driven approach to construct DS designs for any number of run size. This approach is applicable for both even and odd number of factors. The  $D$ -efficiencies of some DS designs constructed via our approach are equivalently optimal to existing theoretical results and higher than those reported in Jones and Nachtsheim (2011) and Xiao et al. (2012).