

Abstract

Diallel cross experiments for comparing p test lines with a control in the set up of block designs and completely randomized designs are investigated. Complete diallel crosses including all $p(p+1)/2$ distinct crosses are considered. Families of A-optimal and efficient type S_0 block designs for $p = 2, 3$, and for $p \geq 4, k = 2$ are obtained, and the construction methods are given. For $p \geq k \geq 3$, and $p \geq 4$, a sufficient condition for type S_0 block designs with the control line appearing tb times, where $t \geq 1$ is an integer, to be A-optimal is obtained, and families of A-optimal type S_0 block designs are provided. The A-optimality of type S designs under the model of completely randomized designs when $2 \leq p \leq 6$ is also studied, and some examples are given.

Keywords and phrases: A-optimality, efficiency, type S block design, type S_0 block design, type S design.