

EFFICIENT DESIGNS FOR TWO-COLOUR MICROARRAY EXPERIMENTS

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Designs for two-colour microarray experiments can be viewed as block designs with two treatments per block. Explicit formulae for the A- and D- optimality criteria can be given when c , the number of blocks minus the number of treatments, is small. These show that the A- and D-optimality criteria conflict badly if there are ten or more treatments. This problem can be avoided by slightly increasing the number of blocks. However, for any given value of c there is a threshold such that when the number of treatments is bigger than the threshold the optimality criteria conflict. The two colours used in each block effectively turn the block design into a row-column design. There is no need to use a design in which every treatment has each colour equally often: rather, an efficient row-column design should be used. For odd replication, I recommend using the row-column design based on the bipartite graph corresponding to an optimal block design for half the number of treatments. I show how to adapt them for experiments in which some treatments have replication only two. For twice the number of blocks as treatments, I give a simple class of designs that perform very much better than the double-reference design.