

SPATIAL SMOOTHING TECHNIQUE IN FIELD EXPERIMENTS

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We generally use block designs in field experiments to control the experimental error due to positional variations. The underlying assumption in classical block designs that the homogeneity of experimental area within the block may not satisfy always, particularly when the block size is large. Also we may not know in advance the soil fertility gradient and other factors influencing the response variable to divide the experimental area into homogeneous blocks. The treatment x block interaction effect is usually taken as experimental error in the analysis of block designs and wherever this interaction effect is present, the inferences may not be true. We propose spatial smoothing technique to estimate/eliminate positional effect in field experiments. We have considered a semiparametric regression model with treatment effect as the parametric component and the positional effect as the nonparametric spatial function. The only assumption about the positional effect is that it is a smooth spatial function. The method can be effectively used both in the presence/absence of treatment x position interaction effect. The proposed method is also extended for the analysis of data in the presence of sudden shifts in the spatial function (positional effect). The method is illustrated through both simulated as well as field experimental data.