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Section 1

MANE 6313

Subsection 1

Week 9, Module C

Student Learning Outcome

- Select an appropriate experimental design with one or more factors,
- Select an appropriate model with one or more factors,
- Evaluate statistical analyses of experimental designs,
- Assess the model adequacy of any experimental design, and
- Interpret model results.

Module Learning Outcome

Describe resolution of an experimental design.

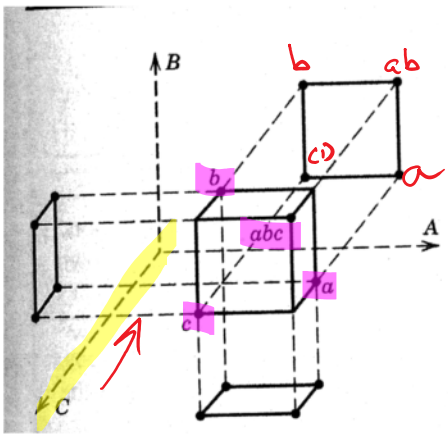
Resolution of Experimental Design

- Definition. A design is of resolution R if no p-factor effect is aliased with another effect containing less than $R - p$ factors.
- The three most common design resolutions are:
  - *Resolution III designs.* No main effect is aliased with any other main effect, but main effects are aliased with two-factor interactions and two-factor interactions may be aliased with each other.
  - *Resolution IV designs.* No main effect is aliased with any other main effect *or* with any two-factor interaction, but two interactions are aliased with other two-factor interactions
  - *Resolution V designs.* No main effect or two-factor interactions is aliased with any other main effect or two-factor interaction, but two-factor interactions are aliased with three-factor interactions.
- In general, the resolution of a two-level fractional factorial design is equal to the smallest number of letters in the defining relation.

Projection of Fractions into Factorials

- Any fractional factorial design of resolution R contains complete factorial designs (possibly replicated factorials) in any subset of $R-1$ factors
- Very useful result in screening experiments
- If we can eliminate variables as being non-significant, the fractional factorial design may become a (replicated) factorial design

- See figure 8.2 on page 333 of your textbook.



■ FIGURE 8.2 Projection of a 2^{3-1}_{III} design into three 2^2 designs

C is not statistically significant

full factorial in A, B