Chapter 265

Screening Designs

Introduction

Screening designs are used to find the important factors from a large number (up to 31) of two-level factors. When the number of runs is 4, 8, 16, or 32 (powers of 2), the design is a regular fractional replication. When the number of runs is 12, 20, 24, or 28, the design used is a Plackett-Burman design.

This program uses the screening designs given in Lawson (1987). These designs make it possible to evaluate each main effect, although these are aliased with several interactions.

When you analyze the data from these designs, it is simplest to use our Multiple Regression routine. The Analysis of Two-Level Designs program can be used to analyze designs in which the number of runs is a power of 2 (the non-Plackett Burman designs).

Example 1 – Screening Design

This section presents an example of how to generate an experimental design using this program. **CAUTION: since the purpose of this routine is to generate (not analyze) data, you should always begin with an empty dataset.**

In this example, we will show you how to generate a six-factor design using 16 runs.

Setup

To run this example, complete the following steps:

1 Specify the Screening Designs procedure options

- Find and open the **Screening Designs** procedure using the menus or the Procedure Navigator.
- The settings for this example are listed below and are stored in the **Example 1** settings file. To load these settings to the procedure window, click **Open Example Settings File** in the Help Center or File menu.

Design Tab

Runs **16**
Sort Order...**Standard**
Factor 1 ....**-1 1**
Factor 2 ....**-1 1**
Factor 3 ....**-1 1**
Factor 4 ....**-1 1**
Factor 5 ....**-1 1**
Factor 6 ....**-1 1**

Storage Tab

Store the Design Data in the Data Table ....**Checked**

2 Run the procedure

- Click the **Run** button to perform the calculations and generate the output.

Six-Factor Screening Design in Sixteen Runs

Experimental Design

Row	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
1	-1	-1	-1	-1	-1	-1
2	1	-1	-1	-1	1	1
3	-1	1	-1	-1	1	1
4	1	1	-1	-1	-1	-1
5	-1	-1	1	-1	1	-1
6	1	-1	1	-1	-1	1
7	-1	1	1	-1	-1	1
8	1	1	1	-1	1	-1
9	-1	-1	-1	1	-1	1
10	1	-1	-1	1	1	-1
11	-1	1	-1	1	1	-1
12	1	1	-1	1	-1	1
13	-1	-1	1	1	1	1
14	1	-1	1	1	-1	-1
15	-1	1	1	1	-1	-1
16	1	1	1	1	1	1

The values were also written to the Data Table.

Usually, you would specify the number of runs as close to the number of variables as possible, while still leaving some degrees of freedom for an estimate of error.