

Chapter 887

Taguchi Designs

Introduction

Taguchi experimental designs, often called orthogonal arrays (OA's), consist of a set of fractional factorial designs which ignore interaction and concentrate on main effect estimation. This procedure generates the most popular set of Taguchi designs.

Taguchi uses the following convention for naming the orthogonal arrays: $L_a(b^c)$, where a is the number of experimental runs, b is the number of levels of each factor, and c is the number of variables. Designs can have factors with several levels, although two and three level designs are the most common. The L_{18} design is perhaps the most popular.

When a design is generated, the levels of each factor can be stored in the current spreadsheet--replacing any data that is already there.

An introduction to experimental design is presented in Chapter 881 on Two-Level Designs and will not be repeated here.

Example 1 – Taguchi 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 data, you should always begin with an empty output spreadsheet.**

In this example, we will show you how to generate an L18 design.

Setup

If the procedure window is not already open, use the PASS Home window to open it. The parameters 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

Design Type.....	L18 2¹ x 3⁷
2-Level Factors	1
3-Level Factors	7
4-Level Factors	0
5-Level Factors	0
Store Data on Spreadsheet	Checked
First Factor Column	1

Output

Click the Calculate button to perform the calculations and generate the following output.

Taguchi L18 Design

Experimental Design

Section 1

Row	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
1	1	1	1	1	1	1	1
2	1	1	2	2	2	2	2
3	1	1	3	3	3	3	3
4	1	2	1	1	2	2	3
5	1	2	2	2	3	3	1
6	1	2	3	3	1	1	2
7	1	3	1	2	1	3	2
8	1	3	2	3	2	1	3
9	1	3	3	1	3	2	1
10	2	1	1	3	3	2	2
11	2	1	2	1	1	3	3
12	2	1	3	2	2	1	1
13	2	2	1	2	3	1	3
14	2	2	2	3	1	2	1
15	2	2	3	1	2	3	2
16	2	3	1	3	2	3	1
17	2	3	2	1	3	1	2
18	2	3	3	2	1	2	3

Section 2

Row	Factor 8
1	1
2	2
3	3
4	3
5	1
6	2
7	3
8	1
9	2
10	1
11	2
12	3
13	2
14	3
15	1
16	2
17	3
18	1

The values were also produced on the spreadsheet.

These values are also generated on the spreadsheet. You can use the Find/Replace facility of the spreadsheet if you want to change the values from 1, 2, 3 to something more meaningful.