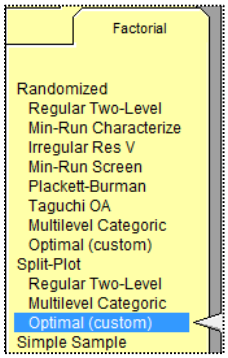
Optimal Split-Plot Tutorial for Design-Expert® Software

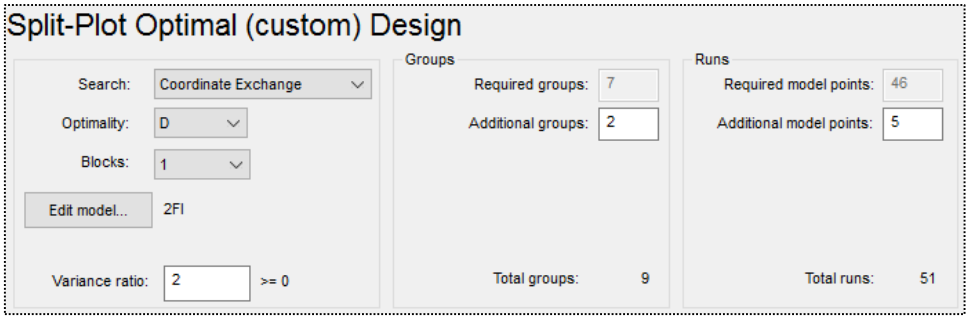
Introduction

This tutorial provides an overview on building an optimal split-plot design. It continues on from the Split-Plot Tutorial to illustrate how an experimenter might get by with a fraction of the runs via optimal design. To save time typing, you will work from a 'starter' file that provides prefilled factor names.



Building the Design

1) Open DX10 and, via **File** on the main menu (or the Open Design icon—the open folder), follow **Open Design** to the file titled "PCR as Optimal Build (starter).dxpx". **Open** this and rebuild it via **File**, **New Design** by clicking **Yes** to "Use previous design info?". You will now see the factors from the prior feature-tour tutorial.
2) From the Split-Plot section on the Factorial tab, choose an **Optimal (custom)** design. This option treats factors as categoric, thus making it more versatile for screening or characterizing a number of multilevel inputs, such as a variety of materials made by a number of suppliers on several types of equipment. Press **Continue**.
3) Review the design settings for this custom build. Design-Expert chooses the model points and group count based on the number of hard-to-change factors and the model chosen, which by default will be the **2FI** (two-factor interaction). For more information, read the explanations on your screen and get further details via Screen Tips under Tips on the main menu (or by simply pressing the light-bulb icon on your screen). After studying this, click **Continue**.



4) Accept the prefilled response ("Amplification") and defaults for the delta and sigma. Click **Continue**. Now the program builds the design, which may take a few minutes.
5) Review the results on power. With the restriction on runs for the whole-plot factors (done to make the experiment easier on these hard-to-change settings), the power is lower than if it were a completely randomized design. Click **Finish** to see the 51-run optimal design split up into 9 groups (whole plots).

This concludes our feature tour on designing an optimal split plot experiment. Go back to the prior tutorial for the analysis of results from this polymerase chain reaction (PCR). Presumably this optimal option would lead to similar conclusions in only a fraction of the runs—51 versus 512 for the full factorial, albeit with lower power. That's a good deal!