

3D GUI User Manual for SPADE

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Outline

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Introduction

- This 3D GUI is used to visualize the abstract relationship between design targets and a pair of parameters.
- The pair of parameters are considered to be random variables which satisfy the 2D Gaussian distribution:

$$f(x, y) = \frac{1}{2\pi\sigma_x\sigma_y\sqrt{1-\rho^2}} e^{-\frac{1}{1-\rho^2}\left[\left(\frac{x-\mu_x}{\sigma_x}\right)^2 - \frac{2\rho(x-\mu_x)(y-\mu_y)}{\sigma_x\sigma_y} + \left(\frac{y-\mu_y}{\sigma_y}\right)^2\right]}$$

Hot Keys in Surface Window

- <ESC> – Exit the 3D GUI.
- <Arrow Keys>, PgUp, PgDown – Rotate the view port.
- I – Reset the cutting plane position.
- i – Reset the view port.
- <SPACE> – Reset both the view port and the cutting plane position.
- g – Show grids on the surface or not.

Hot Keys in Surface Window

- **P, p, B, b** – Save current contour and keep it in Contour window using different colors.
- **Home, End** – Move the cutting plane up and down slightly.
- Note:
 - **Right click** on Surface window will pop up a menu where you can choose different design targets.
 - You can drag the cutting plane up and down in the Surface window by **holding the left mouse button**.

Hot Keys in Contour Window

- **C** – Delete all saved contours.
- **c** – Show all saved contours or not.
- **d** – Show design center and its variation area or not.
- **m** – Design center will be constraint to current contour by default. Pressing **m** will set design center free on the whole parameter plane. Turn it to the default case by pressing **m** again.
- Note: **Right click** on the Contour Window will show the legend of design center variation area.

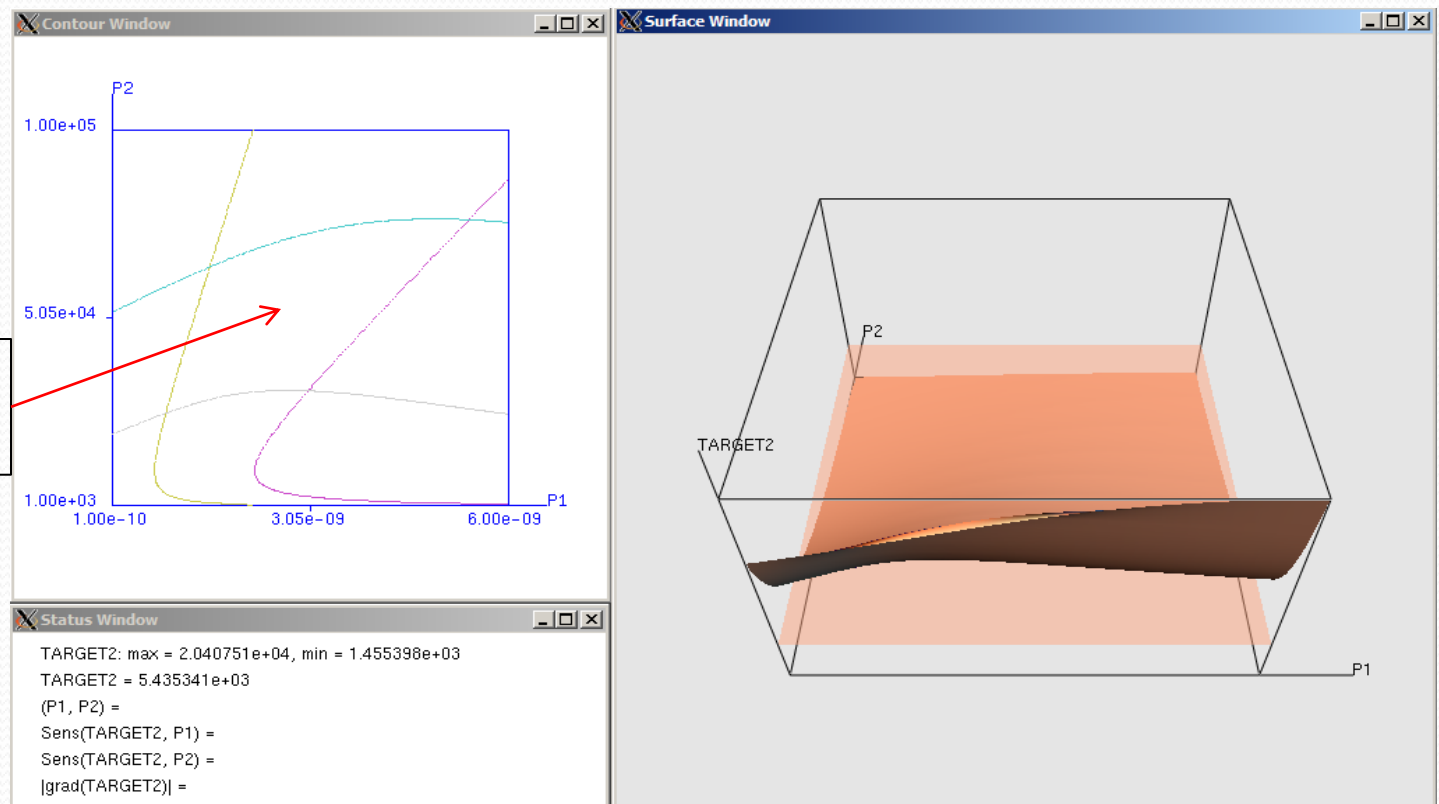
Tips

- Hot keys of Surface/Contour window will be available only if the window is on the top of all windows.
- Some Hot keys are case-sensitive.

Example

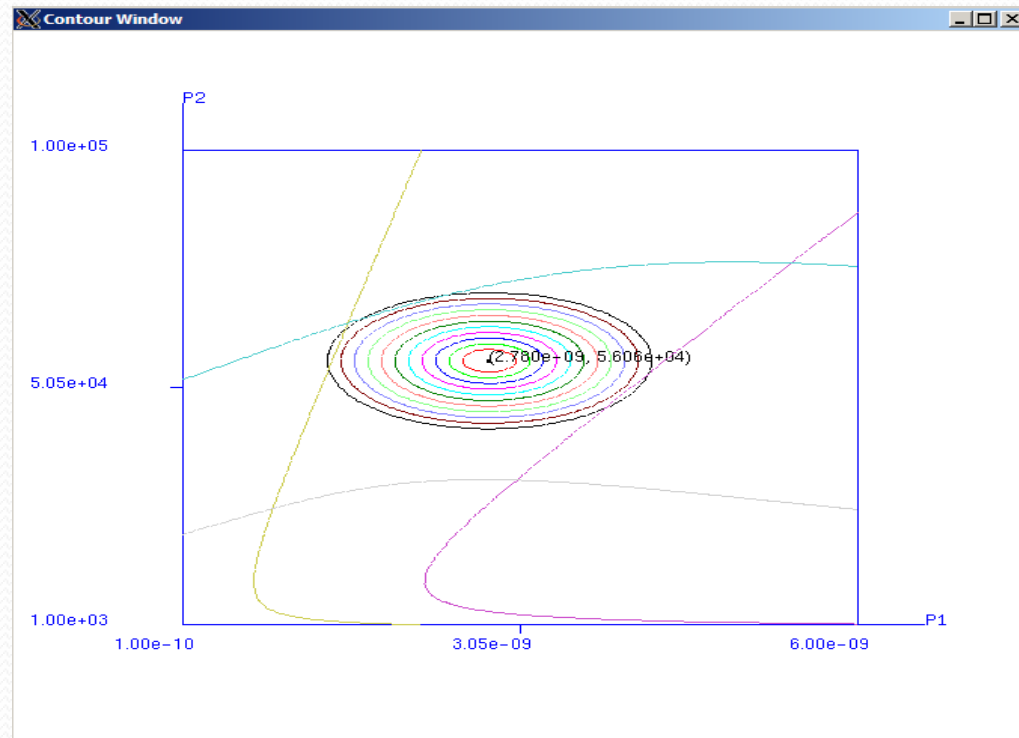
- Use key **P**, **p**, **B** and/or **b** in Surface window to build the constraint area.

Constraint
area



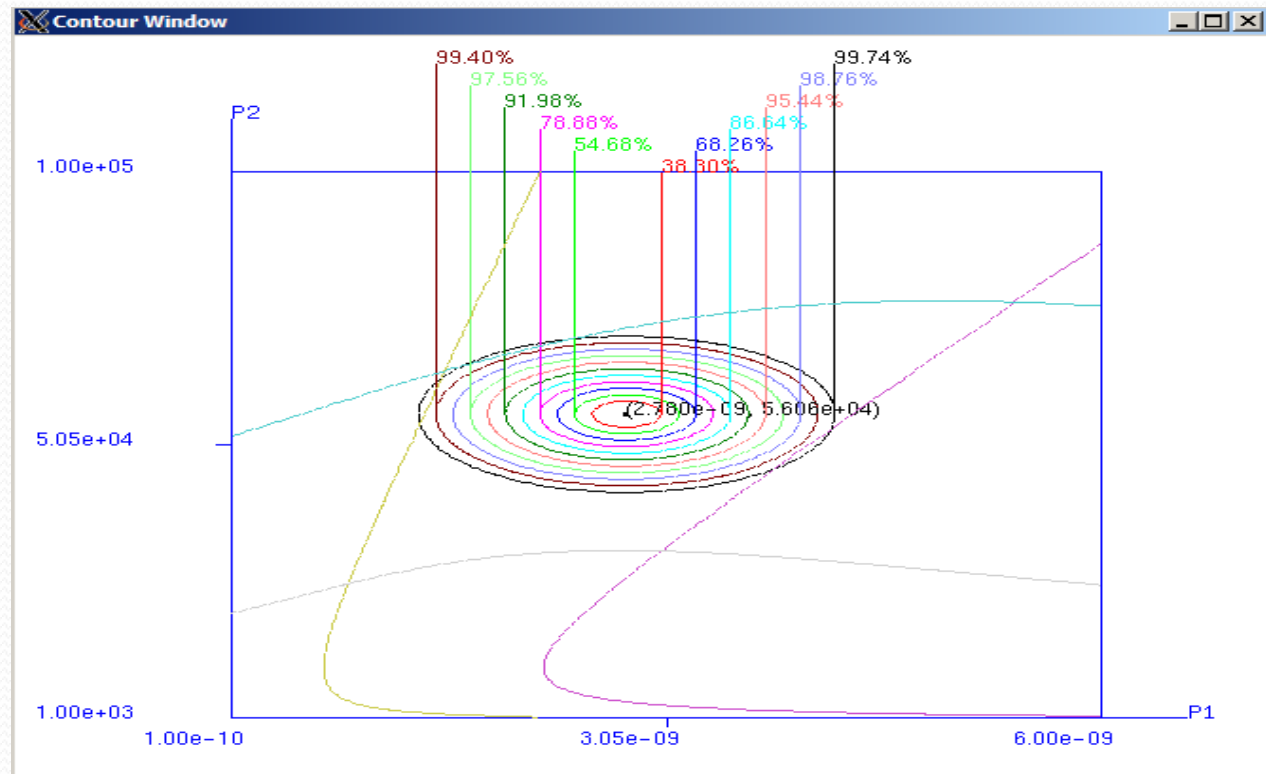
Example

- Choose a better design center in Contour window so that the overlapped region between the variation area (eclipses) and the constraint area is as large as possible.



Example

- You can enable the legend by **right click** on Contour window and estimate the yield of current design center.





Thank you!