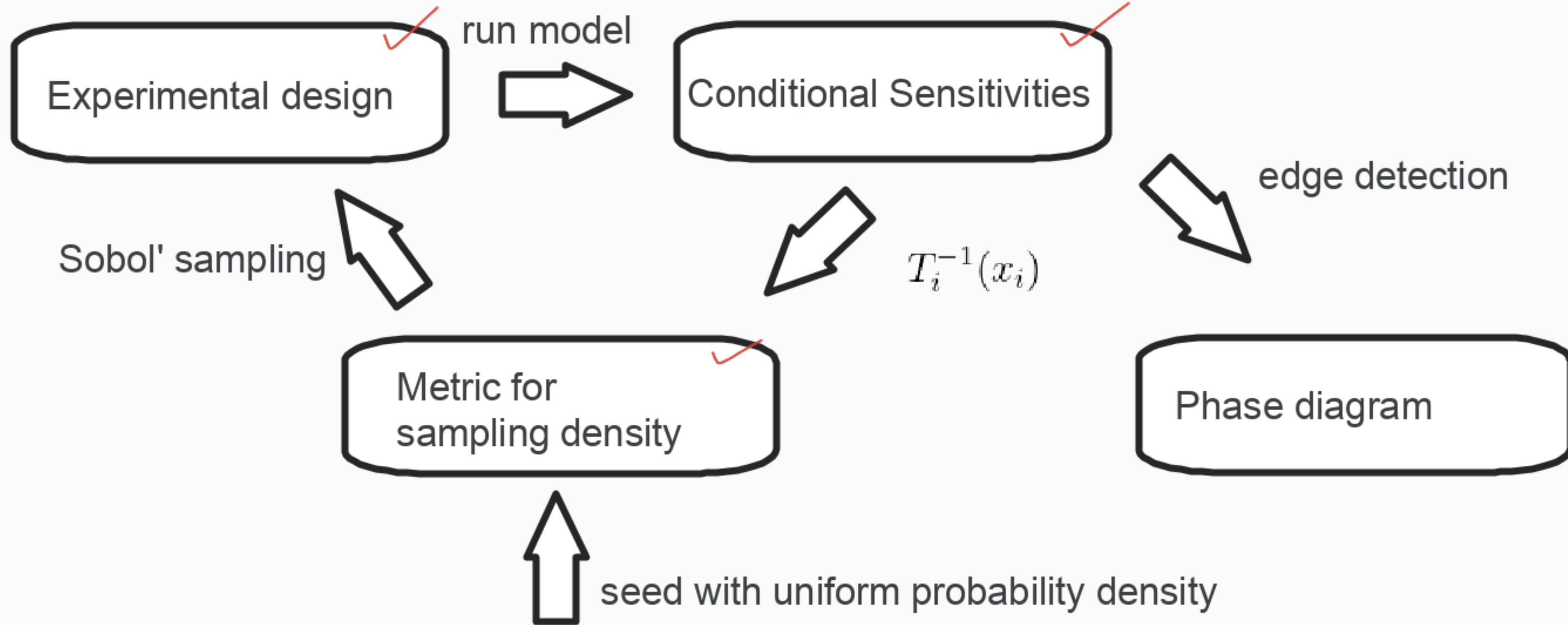
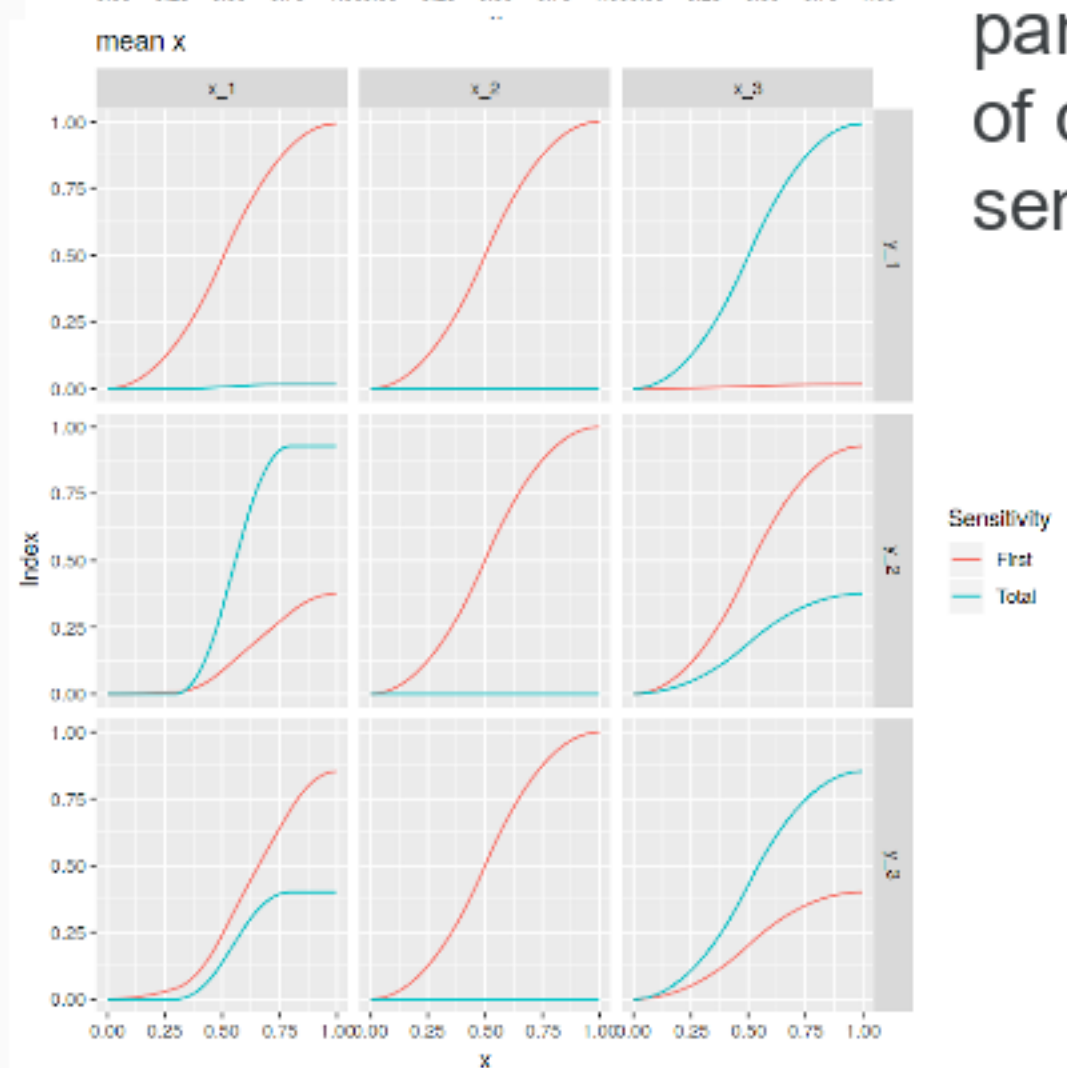
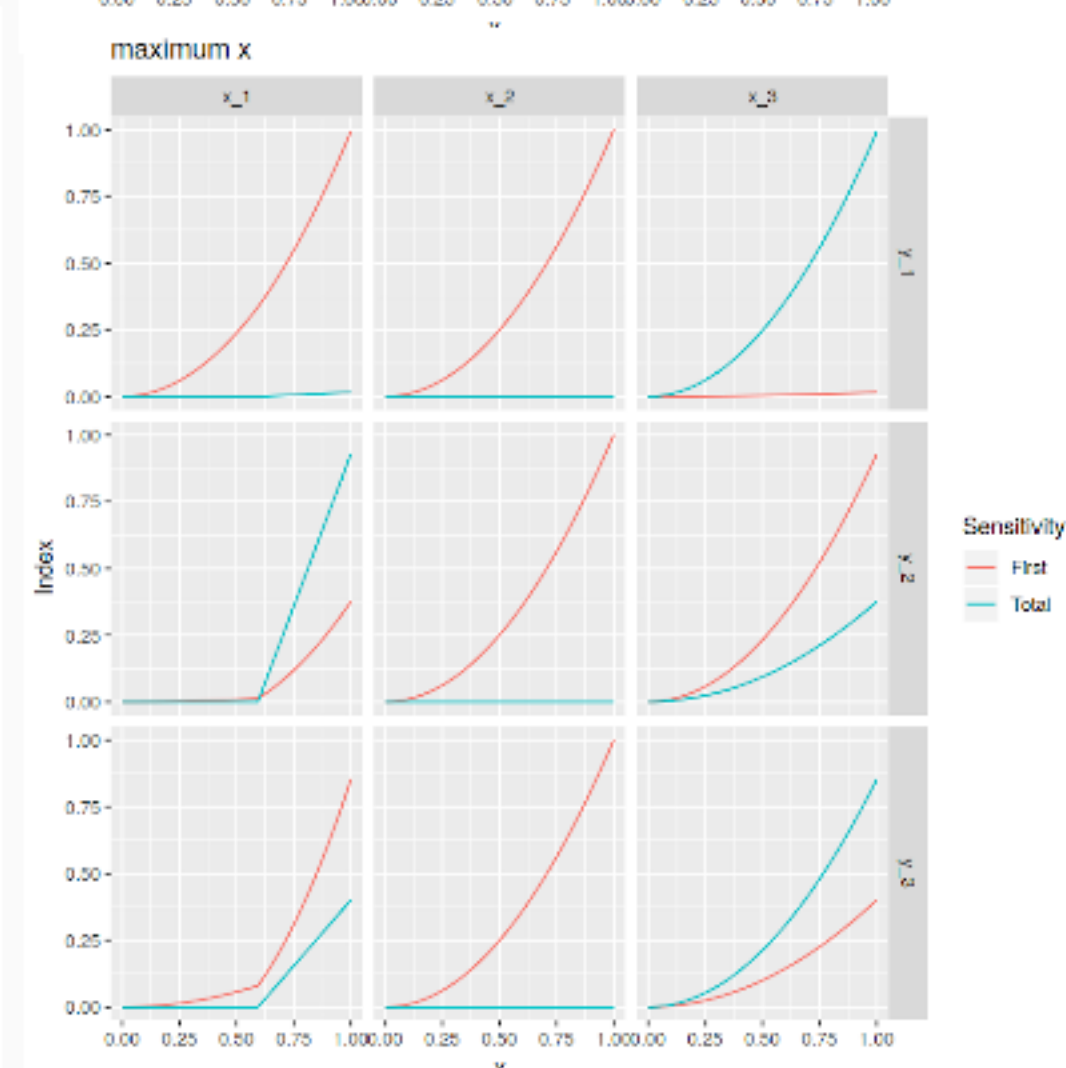
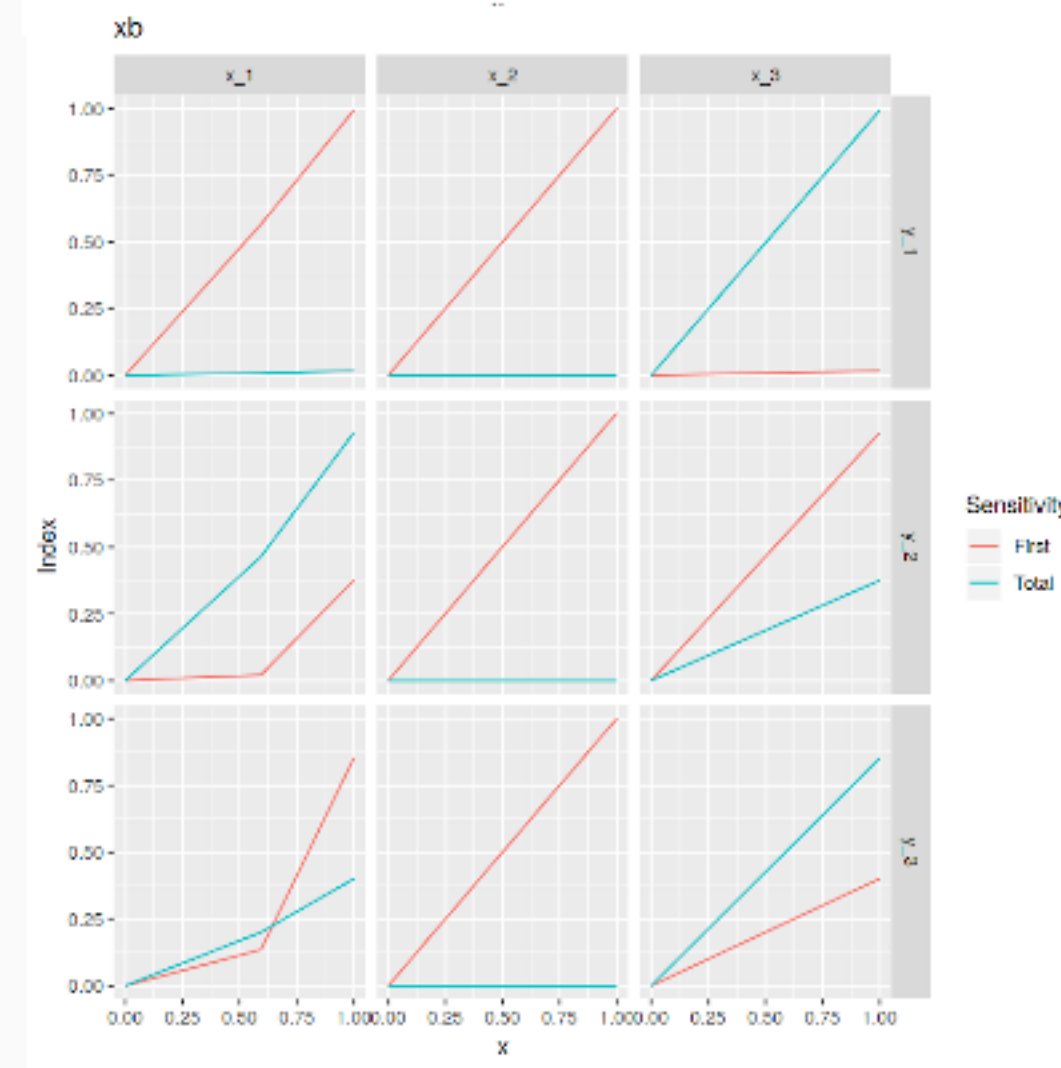
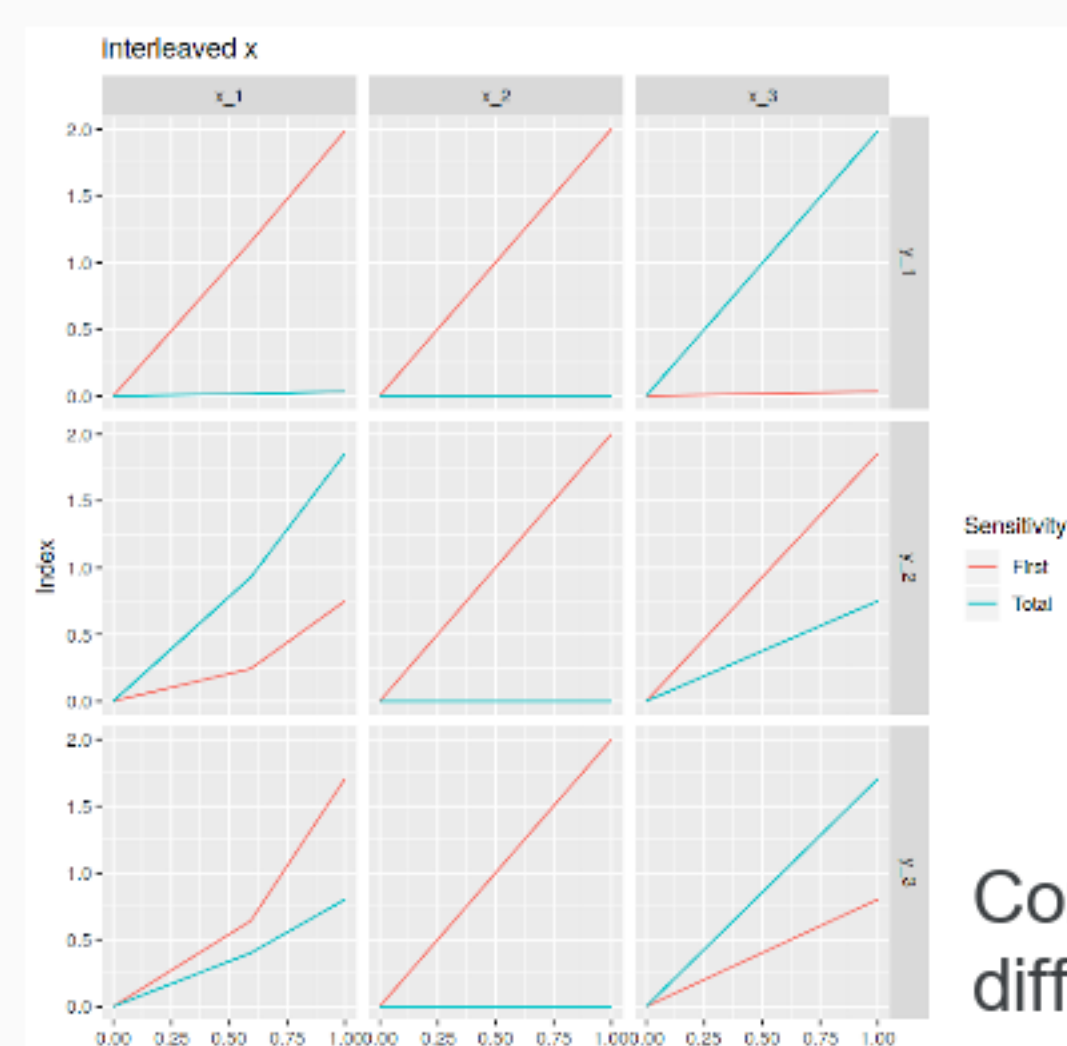
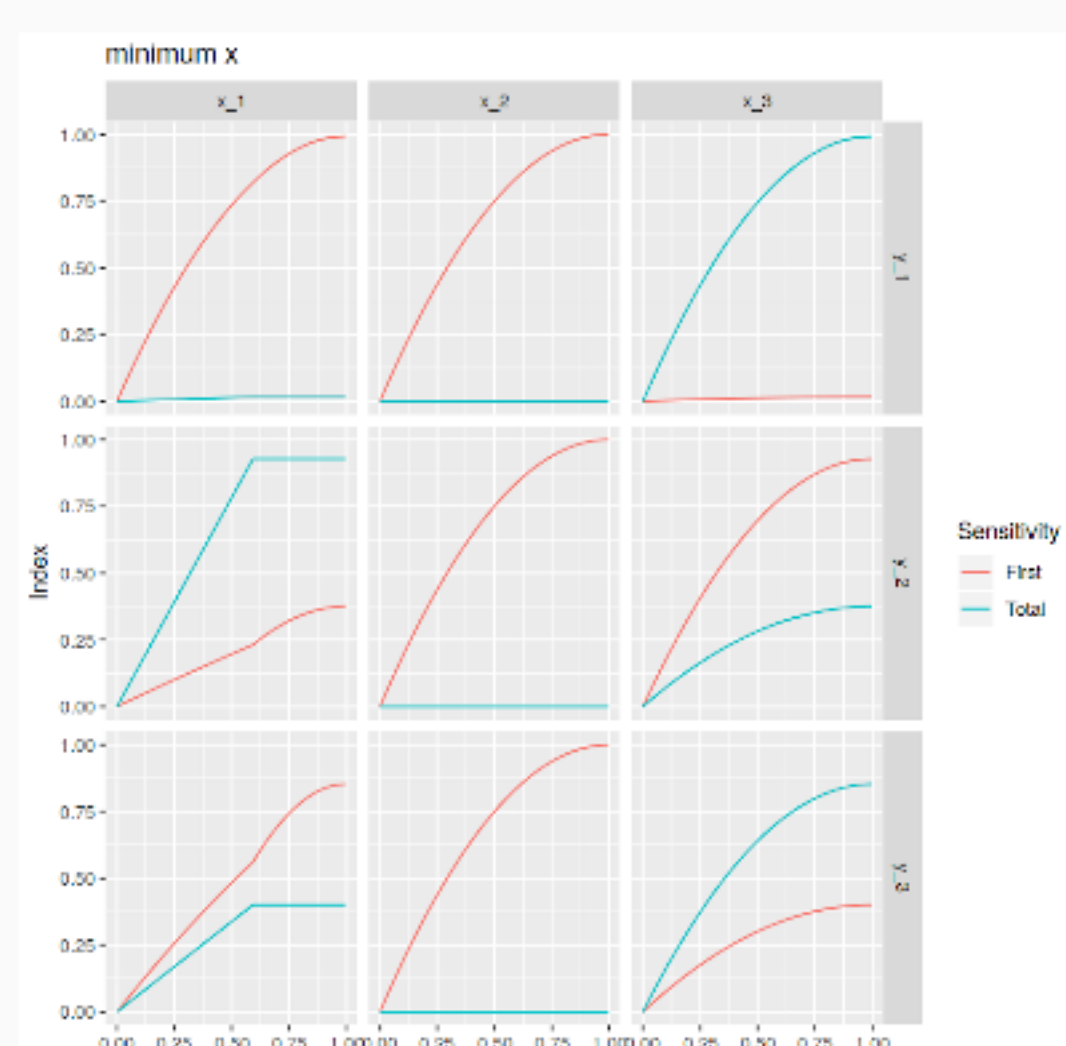
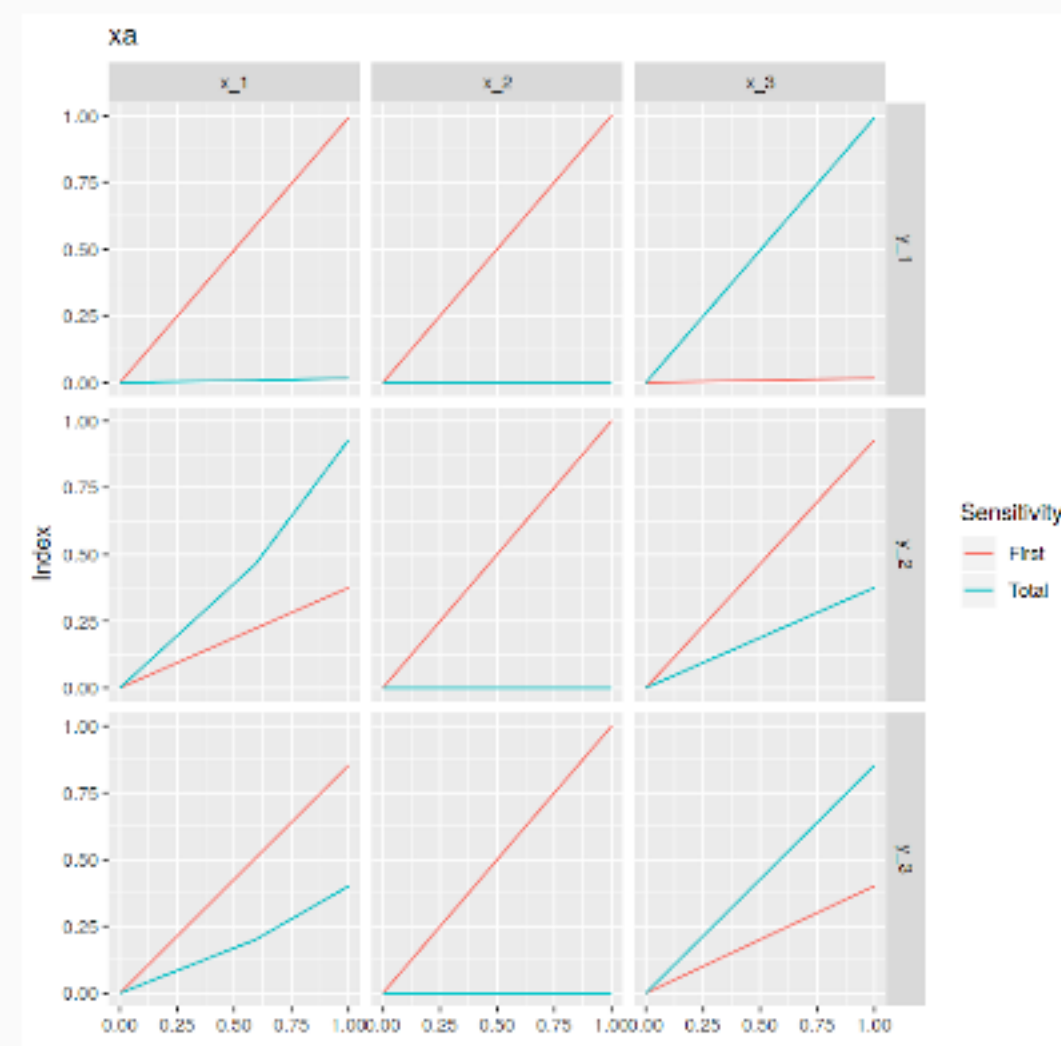
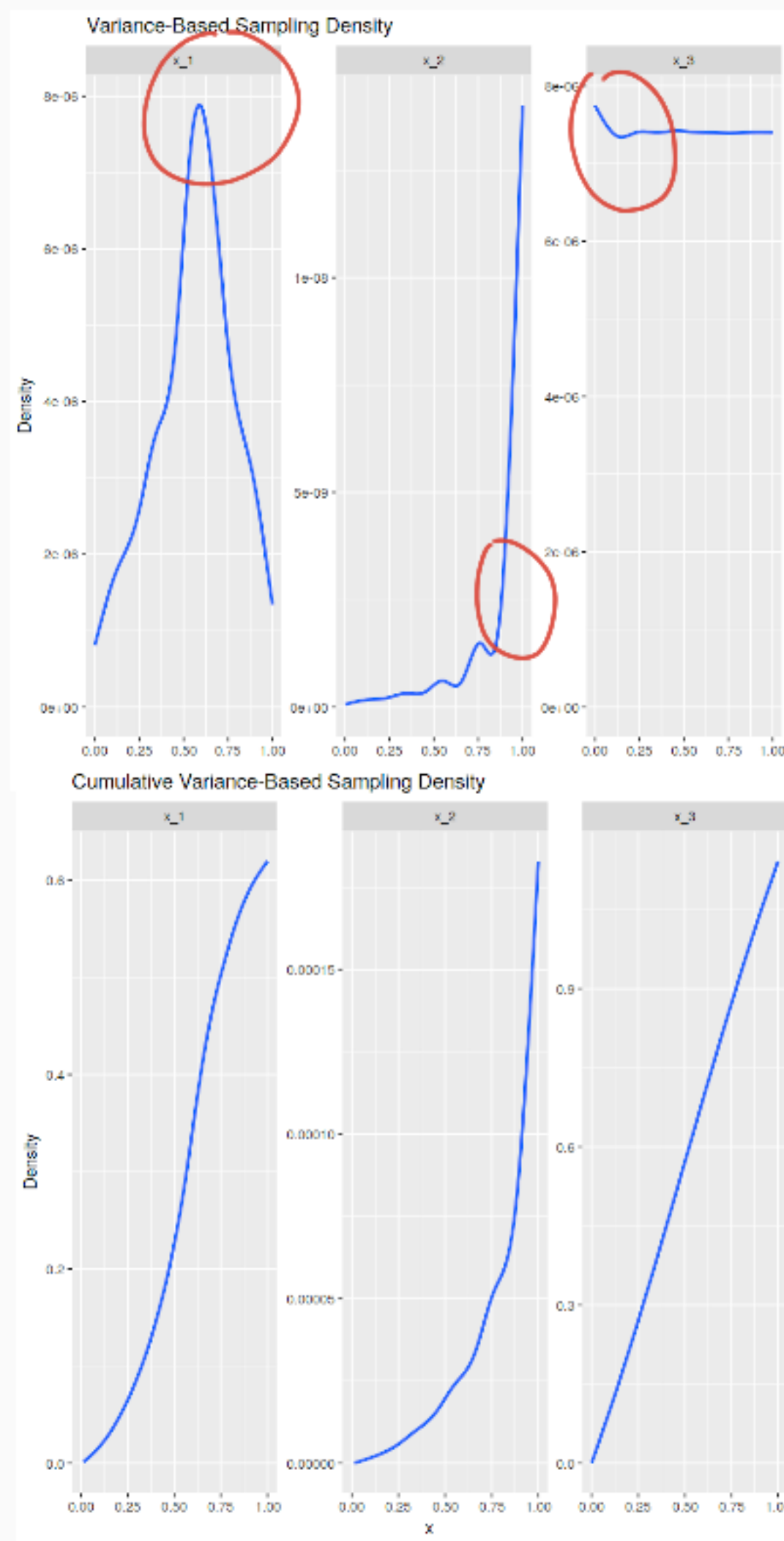


Sequential Sensitivity Analysis





Comparison of
different
parameterizations
of cumulative
sensitivities



local sensitivity:

$$v_{i,j}^{(\alpha)}(x) = \sum_{k=1}^N 1_{\min\{x_{A,i}^{(k)}, x_{B,i}^{(k)}\} \leq x \leq \max\{x_{A,i}^{(k)}, x_{B,i}^{(k)}\}} \frac{|y_{A,j}^{(k)} - y_{A_{B,i},j}^{(k)}|^\alpha}{|x_{A,i}^{(k)} - x_{B,i}^{(k)}|^\alpha}$$

sampling:

$$w_{i,j}(x) = \sum_{k=1}^N 1_{\min\{x_{A,i}^{(k)}, x_{B,i}^{(k)}\} \leq x \leq \max\{x_{A,i}^{(k)}, x_{B,i}^{(k)}\}} \frac{1}{|x_{A,i}^{(k)} - x_{B,i}^{(k)}|}$$

sensitivity density:

$$\rho_{i,j}^{(\alpha)}(x) = \frac{v_{i,j}^{(\alpha)}(x)}{w_{i,j}(x)} = \frac{v_{i,j}^{(\alpha)}(x)}{v_{i,j}^{(0)}(x)}$$

The sole free parameter α determines the intensity of the focus on areas of higher sensitivity. Setting $\alpha = 2$ corresponds to a variance-based sensitivity.

The sensitivity-density method has identified the discontinuities in the toy model: $x_1 = 0.59$ (order 0), $x_2 = 0.95$ (order 1), $x_3 = 0.10$ (order 2).

We use the sensitivity-density as the metric for further samples of the Sobol' sequence.