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Sensitivity analysis of a tool for the design of photovoltaic installations coupled to buildings and under shaded scenarios

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RESEARCH AXIS

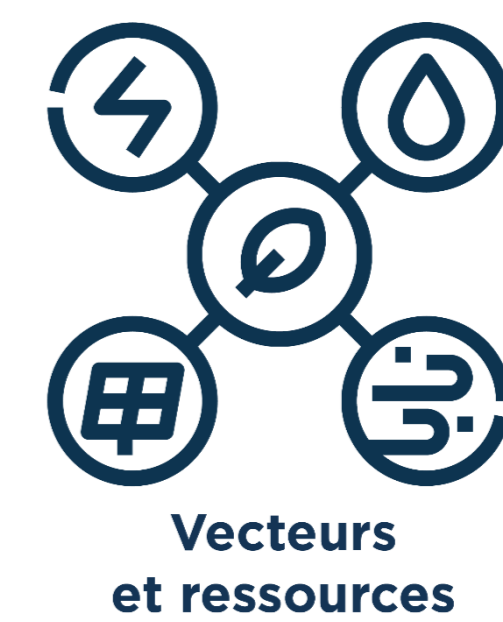
AXIS 2

AN ELECTRIC PLANET?

Renewable energy production is a key driver of the energetic transition and photovoltaic performance tools allow to plan and to take decisions for an enhanced integration.

The reliability of photovoltaic systems can benefit greatly from the identification of critical/interesting regions in the space of the input factors of the models

PRISMS



Context

One of the key conditions for the successful integration of photovoltaic systems is the accuracy of the predicted energy but the variance between predicted and observed hourly values is often significant.

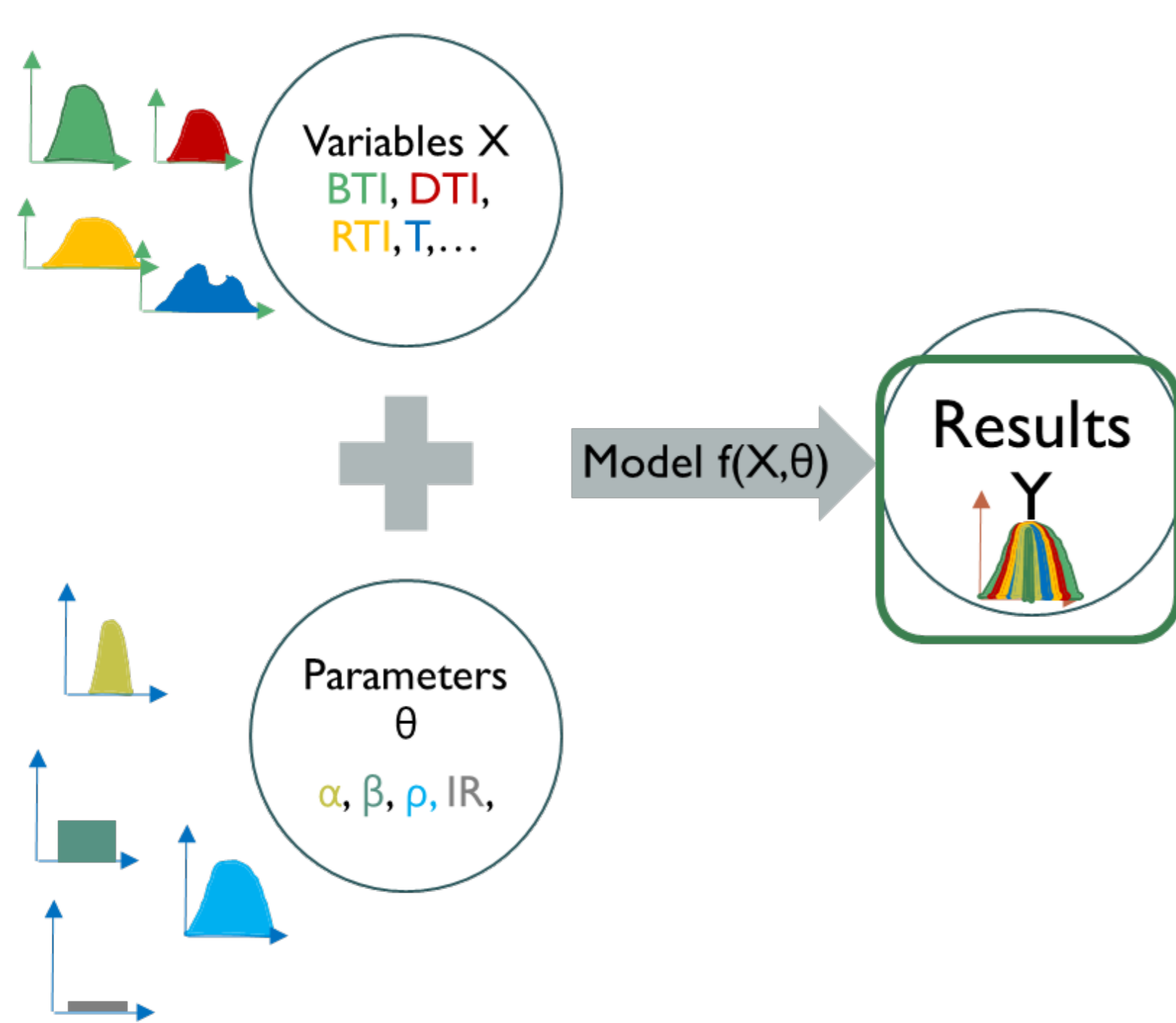
A number of uncertainty sources is identified in the literature but a global analysis including the interactions between those uncertainties at the hourly level is yet missing.

Challenges

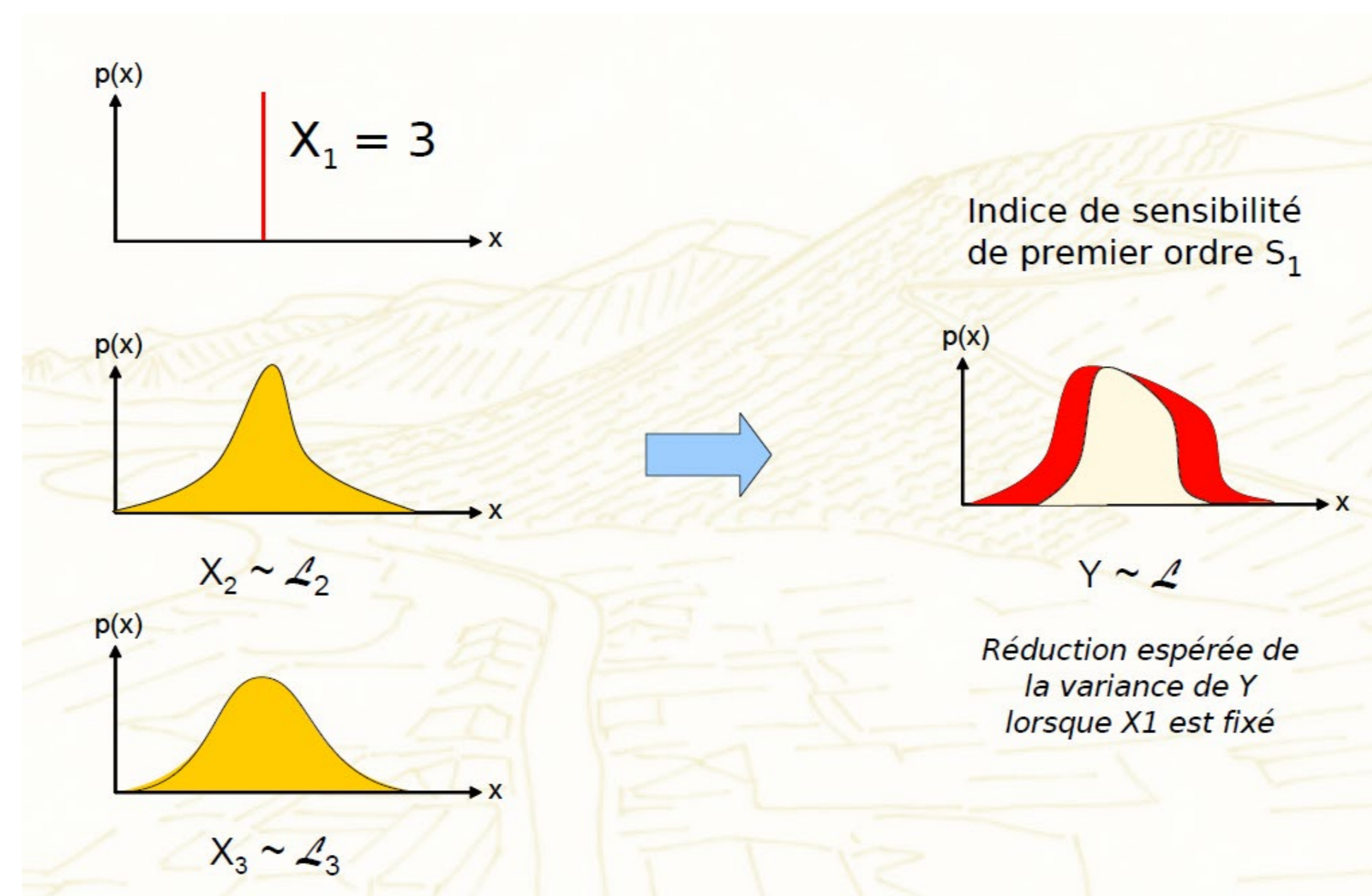
Most planning tools use an interface to allow the user to describe their project with clarity. While a great number of simulations is needed to take into account the extended quantity of existing parameters in a planning tool, the presence of graphic interfaces make the automation of simulations not simple, although it is necessary to find out the uncertainties that are originated by coding or graphic treatment.

Steps of thesis

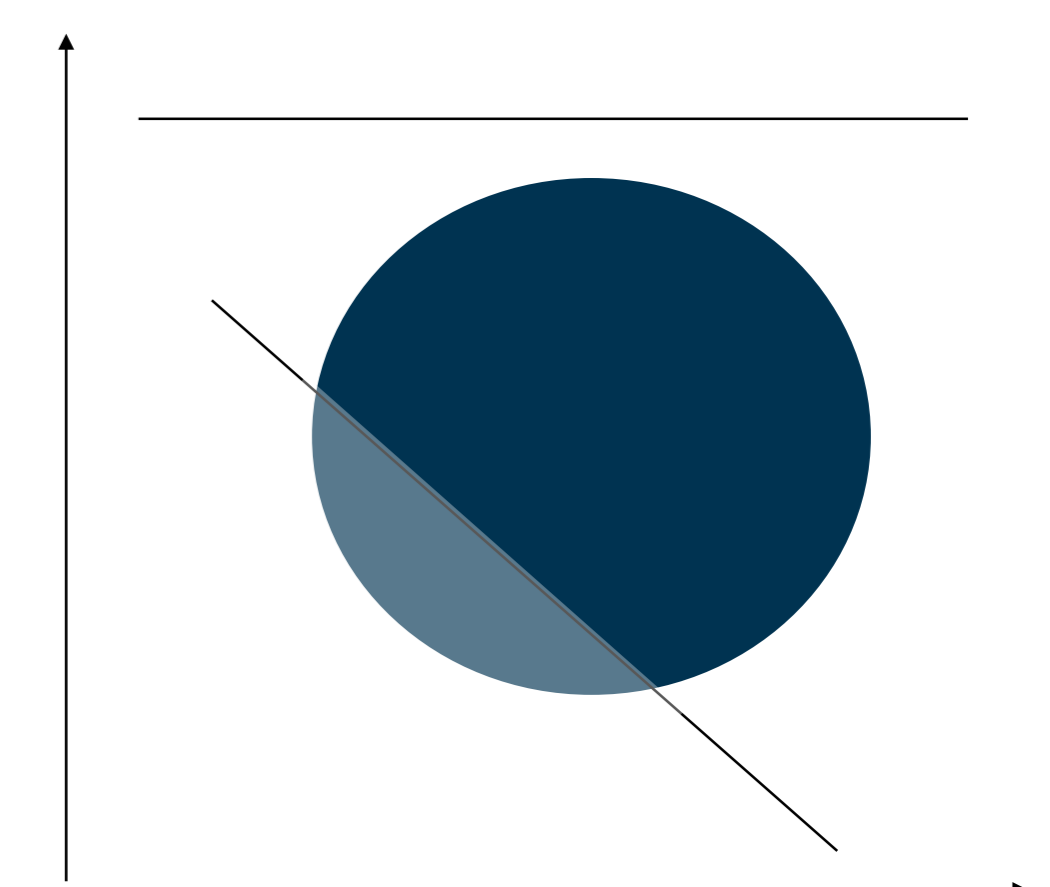
1. Uncertainty propagation



2. Sobol's sensitivity indices



3. Optimisation



Strategy

A global sensitivity analysis is applied to a PV estimation tool, PV Prod by BBS Logiciels, aiming to enhance its robustness. By doing this, we aim to better explain the scope of validity of a photovoltaic tool, the limitations per scenario and the predictive uncertainty of the models of photovoltaic performance. We aim to incorporate a confidence interval to the generated results and we include in our study both uncertain factors and factors that can be modified for the design, thus determining the shading factor. This method is intended to sort out the scenarios with uncertain results and to quantify the uncertainty per groups of settings.