# Warping

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**Abstract** On peut [Victor's comment: faire un commentaire] [Coralie's comment: chacun avec sa couleur], on peut aussi enlever des trucs ou bien ajouter d'autres trucs, et Gael aussi.

# 1 Introduction

[Victor's comment: toi ou moi] Mathematical modelling for design, in particular in epidemiology
   [Victor's comment: pour toi... mais peut- łtre plus facile  faire une fois que le reste aura avanc]
   The sharka model and objectives
   [Victor's comment: le reste de l'intro pour moi]
   Generalities on optimization
   Bayesian optimization
   Problem at hand: dealing with local invariances
   Outline

# 2 Model description and problem set-up

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to do

[Victor's comment: Section  remplir par toi ! Suggestion de plan dtaill.]

What does it model
How the model works
What problem do we want to solve
Inputs description
Invariances descriptions
Table of inputs with range of variation
Table of invariance relations

## 3 Methods  Bayesian optimization

### 3.1 Overview

### 3.2 Bayesian optimization of stochastic simulators

### 3.3 Bayesian optimization with invariances

#### *3.3.1 Definitions*

#### *3.3.2 Simple warping*

#### *3.3.3 Warping based on linear relations*

#### *3.3.4 Combining warpings*

## 4 Experiments on toy problems

### 4.1 Problem descriptions

### 4.2 Comparison metrics

### 4.3 Results

## 5 A warping-based Bayesian optimization of the Sharka model

### 5.1 Numerical setup

#### *5.1.1 Experiments description*

[Victor's comment: Premier jet par toi ?]

#### *5.1.2 Comparison with standard BO*

Description of comparison metrics

[Victor's comment: Idem juste pour les mthodes de comparaison, je me charge du paragraphe pour dire  quoi on se compare et je m'occupe de la partie krigeage et warping.]

5.2 Results and insights into the Sharka model

## 6 Conclusion

What we did (the problem we solved)
What we proposed: warping to tackle invariances. Proof of concept
Possible extensions

## References