A global method for reducing multidimensional size graphs

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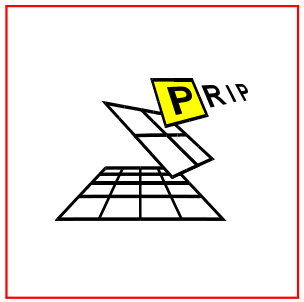

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Introduction

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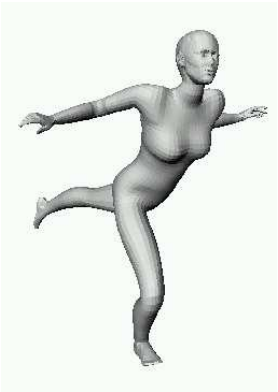
- To model a shape we consider size graphs, i.e. pairs (G, φ) s.t.
  - $G = (V(G), E(G))$ is graph;
  - $\varphi : V(G) \to \mathbb{R}^k$ is a function, called a measuring function and describing the properties considered "relevant" for the comparison.



G

(G, φ)

(G, ς)

(G, ξ)

$\ldots$

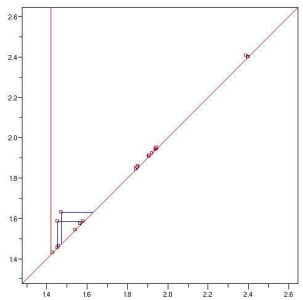
$\ldots$

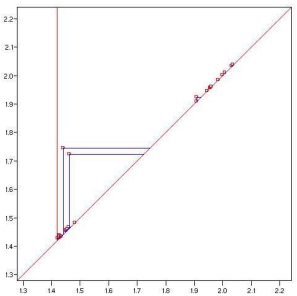
The formal setting

- How can we compare two pairs (G, φ), (H, ψ)?

$$d\left(\underset{(G,\varphi)}{\text{  }} , \underset{(H,\psi)}{\text{  }} \right) = ?$$

- **Size Theory** allows us to describe such a pair by means of suitable shape descriptors (the so–called size functions).

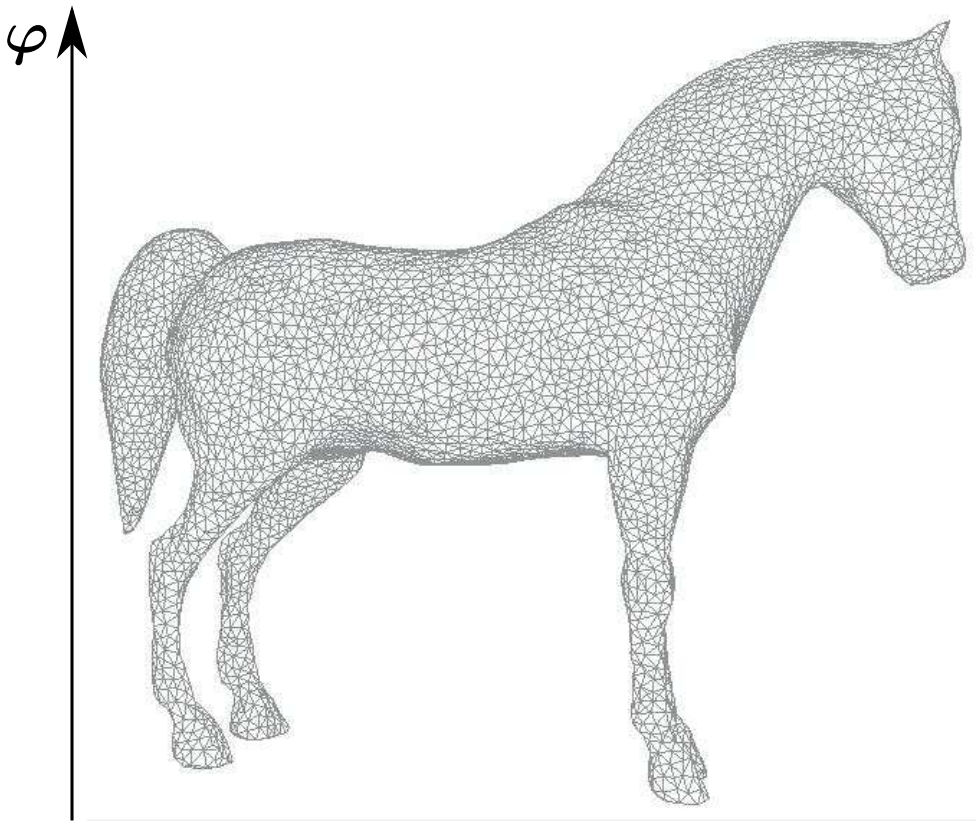



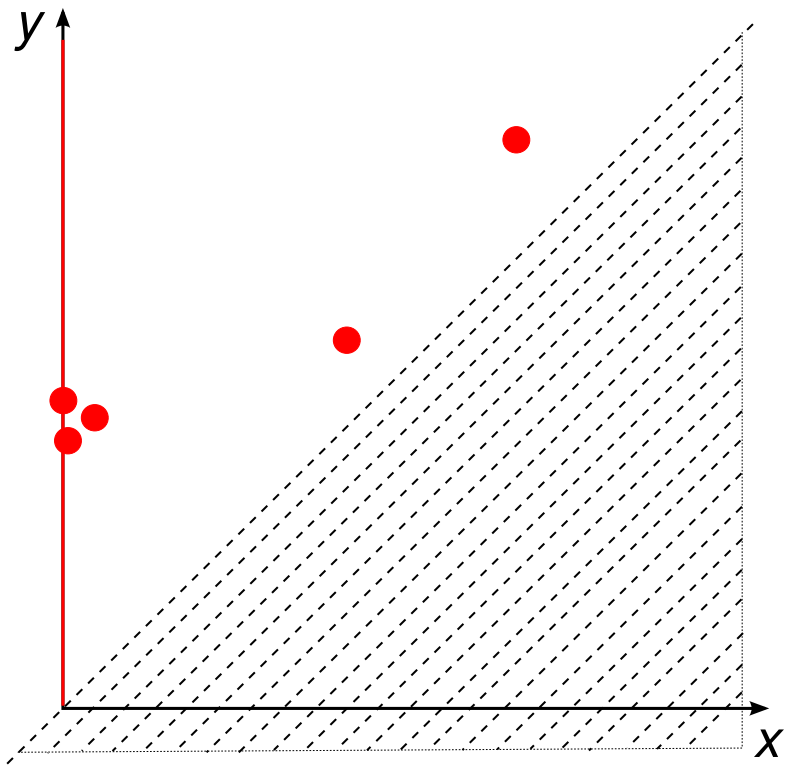


- Instead of comparing shapes, we can compare shape descriptors.

k=1: size graphs and size functions

When $k = 1$, the shape descriptors extracted from a size graph, i.e. its size function, admits a very simple and compact representation.





k>1 multidimensional case: problem and our approach

Problem

When $k > 1$, computing size function in much more complicated
$\Rightarrow$ Higher computational costs

Our approach

We propose a method for reducing size graphs, such that reduced size graphs preserve all the information in terms of size functions
$\Rightarrow$ This can lead to simplify the effective computation of size functions.

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