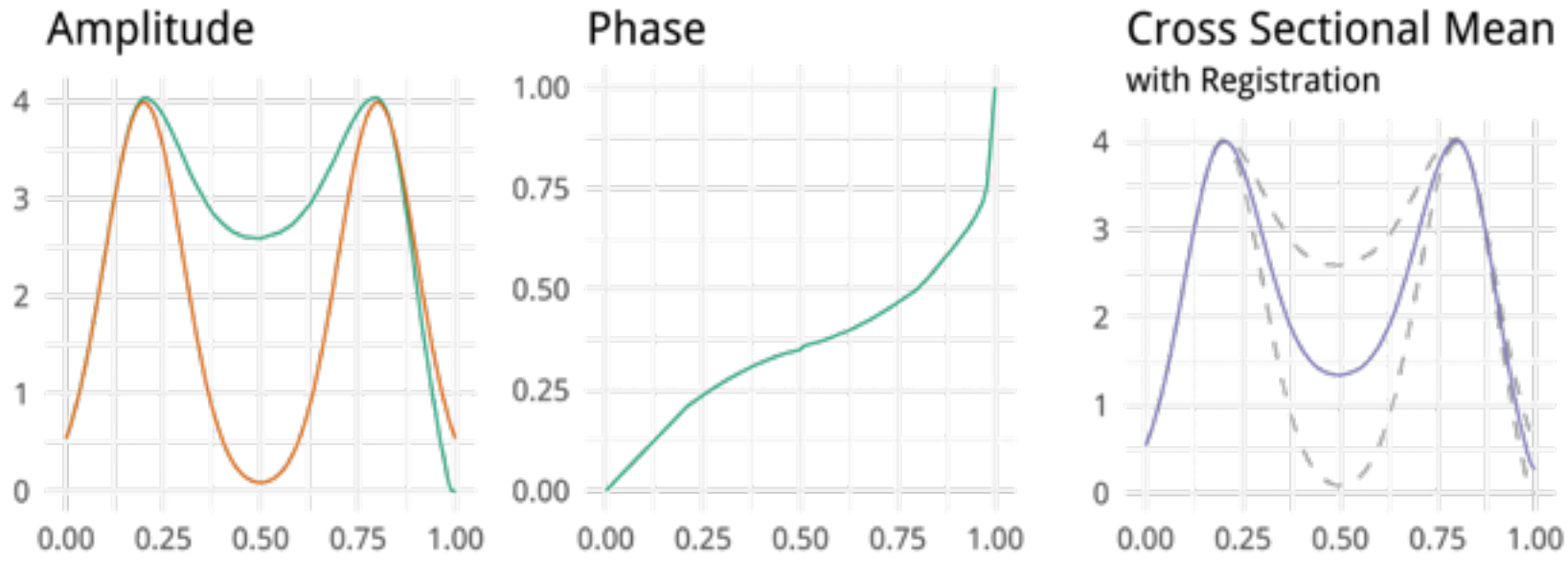
Elastic FDA


Amplitude
4
3
2
1
0
0.00
0.25
0.50
0.75
1.00
Phase
1.00
0.75
0.50
0.25
0.00
0.00
0.25
0.50
0.75
1.00
Cross Sectional Mean
with Registration
4
3
2
1
0
0.00
0.25
0.50
0.75
1.00

Functional Data Analysis

Let f be a real valued-function with the domain $[0,1]$, can be extended to any domain

- Only functions that are absolutely continuous on $[0,1]$ will be considered

Let Γ be the group of all warping functions

$$\Gamma = \{\gamma : [0,1] \to [0,1] \,|\, \gamma(0) = 0, \gamma(1) = 1, \ \gamma \text{ is a diffeo}\}$$

It acts on the function space by composition

$$(f, \gamma) = f \circ \gamma$$

It is common to use the following objective function for alignment

$$\min_{\gamma \in \Gamma} \|f_1 \circ \gamma - f_2\|$$

Note: It is not a distance function since it is not symmetric.