

# Models for models

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## Outline

- Statistical models and tools
- Spatial fields (Wavelets)
- Climate regimes (Regression and clustering)
- Subgrid scale features (Markov models)



# Overview

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## “Data”

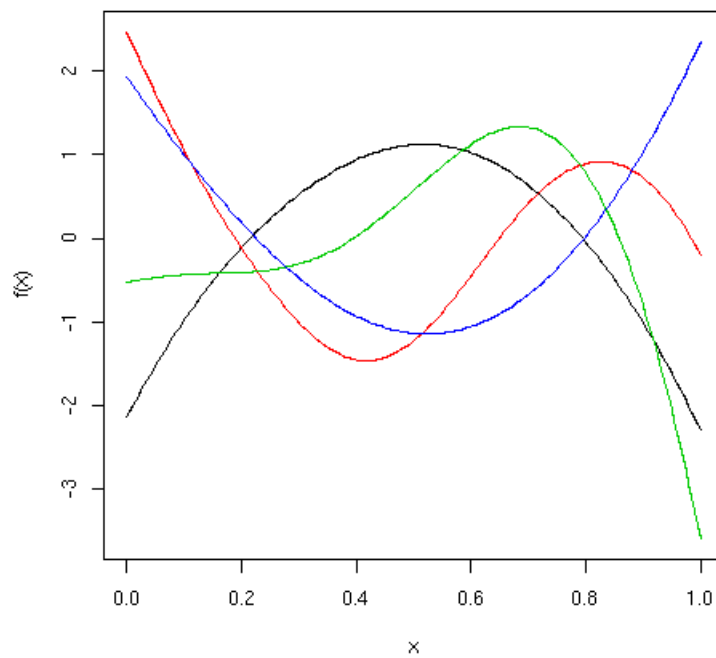
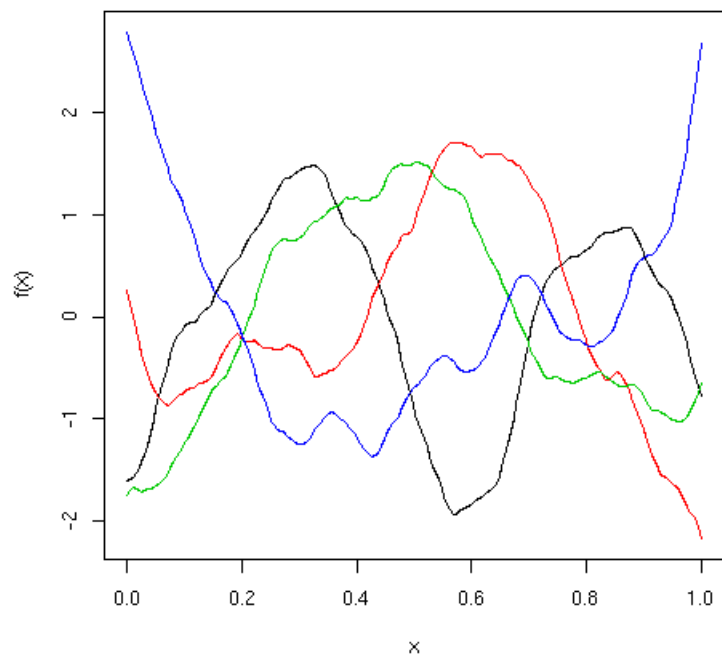
Numerical models produce data at different scales. Statistical techniques can be use to productively summarize and probe model output.

## Statistical models and tools

Perhaps the most important foundation for statistics is the use of statistical models to derive tools for data analysis, inference and representation.

The past 20 years have witnessed a rapid increase in flexible models for complicated processes and features.

”True function”



Some details

## Multiresolution covariance model

$$f(x) = \sum_{j=1}^{\infty} a_j \psi_j(x)$$

$\{\psi_j\}$  Wavelet basis function – fixed.

$\{a_j\}$  Gaussian with a small number of correlations – random.

Simulated curves as prior:

$$f(x) = \sum_{j=1}^{\infty} b_j \psi_j(x)$$

where  $a_j$  is random.