

Change-point problems arise in many fields of life sciences and above, from genomics to climate. The general problem can be stated as follows: consider a series of observation along time, the distribution of which is subject to abrupt changes, can we infer the number of change-points, their location, the magnitude of the change, etc.?

Such problems have been intensively studied in the statistical literature and raise several types of issues in terms of model selection (how many change-points?), algorithmics (the segmentation-space is exponentially large with respect to the length of the series) or modelling (how to account for some dependency between the series).

We will present a series of models and corresponding inference algorithms, focusing on deterministic methods. We will also limit ourselves to algorithms that recover exactly the optimal segmentation (in terms of likelihood) or provide the exact posterior distribution of various quantities of interest. These methods will be illustrated with application in genomics.