Description of Model Selector

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January 19, 2024

This document describes the implementations of the class *CLFModel*.

1 Model Description

The class *CLFModel* implements a Constant Level Fitting (CLF) model, where the maximum number of (assumed) levels M can be specified. This finite number of levels makes it fundamentally different from a standard PWC model, as the exact same level is potentially visited multiple times, depending on the given data.

A factor graph of a model achieving this desired behaviour is shown in Figure 1. It consists of M constant levels that are connected through a model selector as implemented in class *ModelSelector*. It is given N observations (denoted by y_i, $i \in \{1, \dots, N\}$) of general dimension $D \geq 1$. Generally, Gaussian message passing can not be performed in the depicted factor graph due to the multiplication nodes (because the product of two normally distributed RVs is no longer Gaussian). To tackle this issue, class *CLFModel* implements an iterative approach, where either the model selector vectors S_i or the levels $X_{i,m}$ are assumed to be known and fixed, while the estimation of the other quantities are improved. This causes the message passes through the multiplication notes to become simple scalar / vector multiplications, which can easily be handled by Gaussian message passing. Furthermore, it makes the factor graph loop-free.

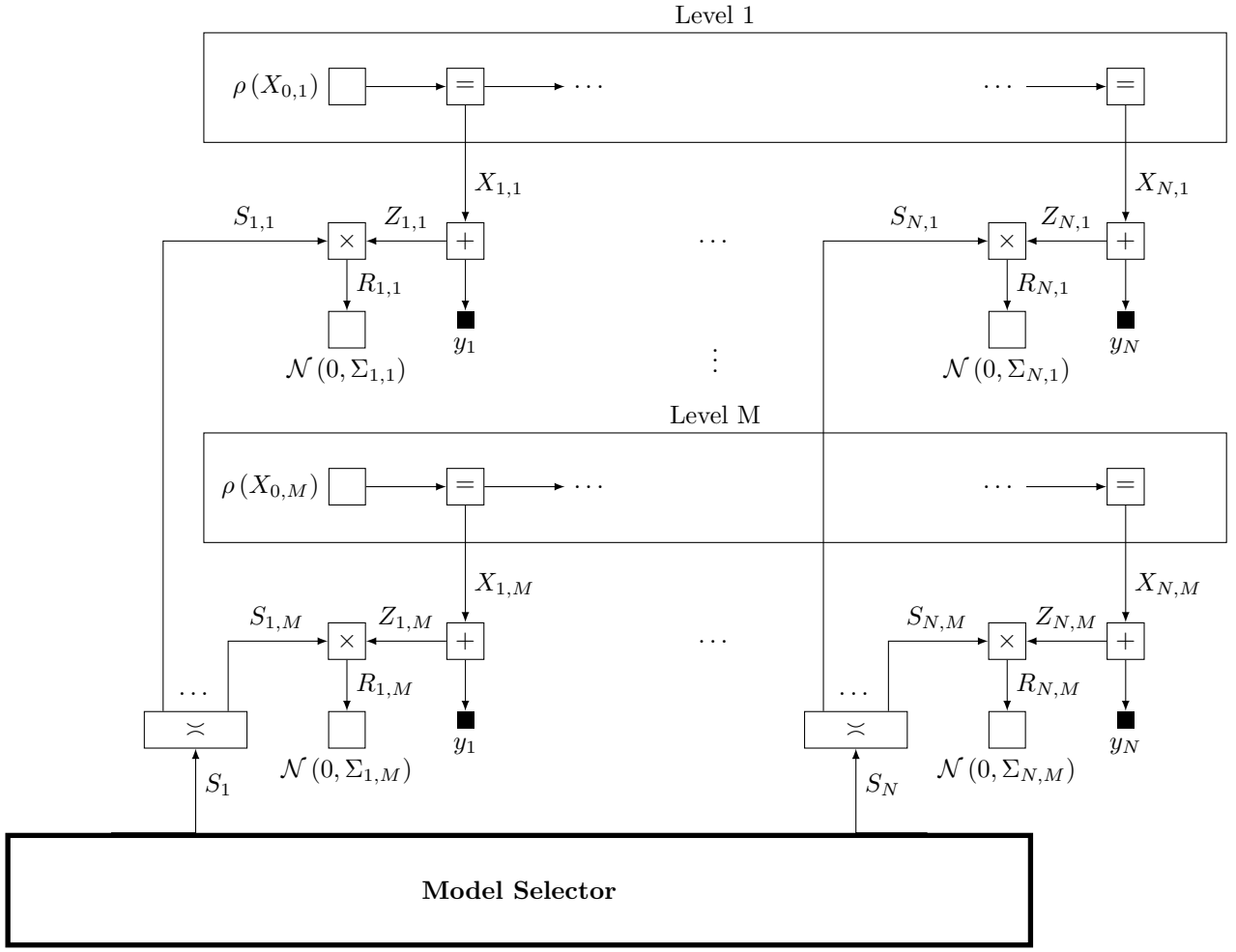

Figure 1: TODO

2 Explanation of Implementations

References