Given a density forest with T trees trained with axis-aligned weak learners and an input value $x = x^*$:

(1) Sample uniformly $t \in \{1, \cdots, T\}$ to select a tree in the forest.
(2) Starting at the root node descend the tree by:

- at x-nodes applying the split function and following the corresponding branch.
- at a y-node j random sample one of the two children according to their respective probabilities: $P_{2j+1} = \frac{|\mathcal{S}_{2j+1}|}{|\mathcal{S}_j|}$, $P_{2j+2} = \frac{|\mathcal{S}_{2j+2}|}{|\mathcal{S}_j|}$.

(3) Repeat step 2 until a (single) leaf is reached.
(4) At the leaf sample a value y from the *domain bounded* 1D conditional $p(y|x = x^*)$ of the 2D Gaussian stored at that leaf.

Algorithm 5.3: **Sampling from conditionals via a forest.**

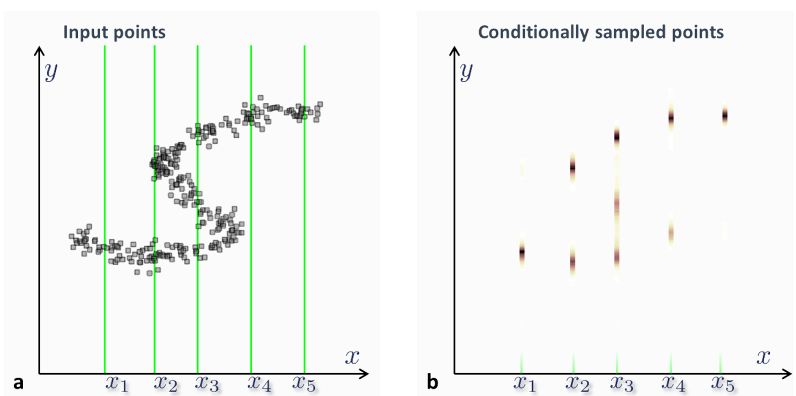

Fig. 5.16: **Results on conditional point sampling.** Tens of thousands of random samples of y are drawn for five fixed positions in x following algorithm 5.3. In (b) the multimodal nature of the underlying conditional becomes apparent from the empirical distribution of the samples.

the estimated density ($p(\mathbf{v})$) and the ground-truth one ($p_{\texttt{gt}}(\mathbf{v})$) can be carried out. The density reconstruction error is computed here as a