

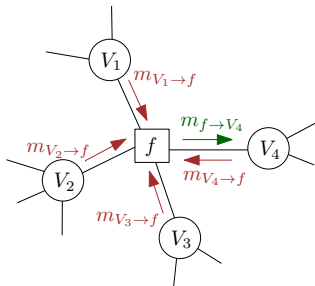
## Kernel-Based Just-In-Time Learning for Passing Expectation Propagation Messages

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- At each iteration, EP computes:

$$m_{f \rightarrow V_i} = g(m_{V_1 \rightarrow f}, \dots, m_{V_4 \rightarrow f}).$$

- Marginal belief:  $p(V_i) = \prod_j m_{f_j \rightarrow V_i}$ .

- $g$  is expensive to compute.
- Goal:** Learn an uncertainty aware cheap regression function

in. messages  $\mapsto$  out. message

- Orders of magnitude faster than quadrature. Same inference quality.
- Automatic detection and adaptation when learned EP updates uncertain.
- Automatic representation of incoming messages with random features.