Appendix

This appendix provides technical details, mathematical derivations, extended examples, and implementation specifications supporting the main text.

Mathematical Foundations

Expected Free Energy Complete Derivation

The Expected Free Energy combines epistemic and pragmatic components (see Equation (**??**)):

$$\mathcal{F}(\pi) = \mathbb{E}_{q(s_\tau)}[\log q(s_\tau) - \log p(s_\tau \mid \pi)] + \mathbb{E}_{q(o_\tau)}[\log p(o_\tau \mid s_\tau) + \log p(s_\tau) - \tag{1}$$

Using the generative model, the pragmatic component becomes:

$$G(\pi) = \mathbb{E}_{q(o_\tau)}[\log \sigma(C) + \log A - \log q(s_\tau)] \tag{2}$$

Where $\sigma(C)$ represents the softmax normalization of preferences.

Generative Model Complete Specifications