Appendix

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

Mathematical Foundations

Expected Free Energy Derivation

The Expected Free Energy (EFE) combines epistemic and pragmatic components:

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

Epistemic Component

The epistemic affordance measures information gain:

$$H[Q(\pi)] = \mathbb{E}_{q(s_\tau)}[\log q(s_\tau) - \log p(s_\tau \mid \pi)]$$

This term is minimized when executing policy ( ) reduces uncertainty about hidden states.