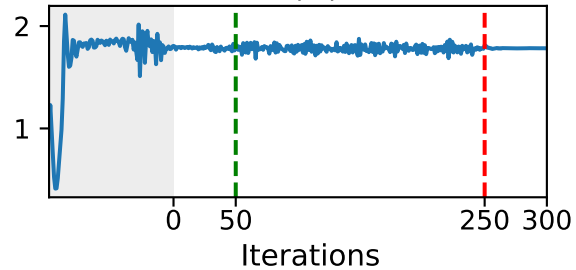
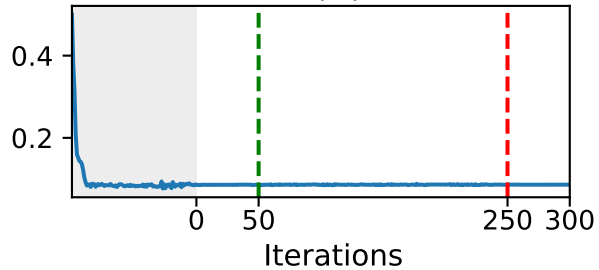
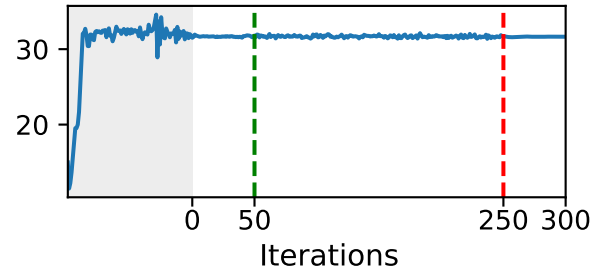
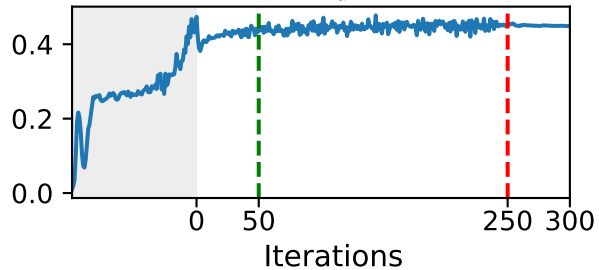
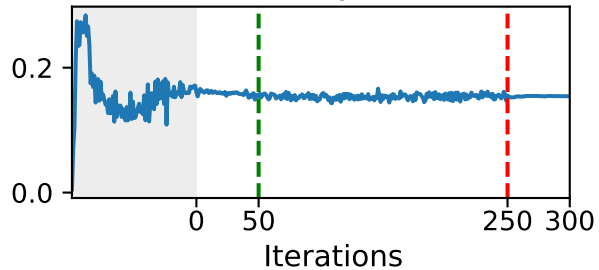
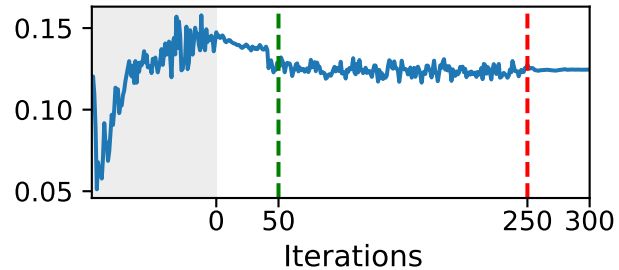
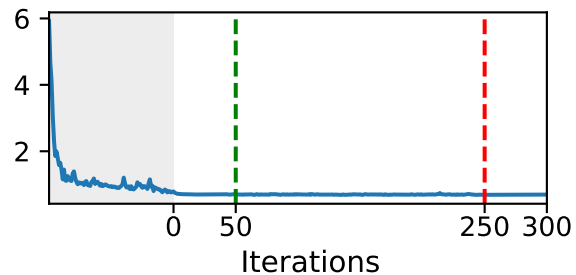


$k_{a, pop}$  $k_{e, pop}$  V_{pop}  ω_{k_a}  ω_{k_e}  ω_V  a  $-\mathcal{L}_\psi(x)$ 