Supplementary File 4: Wake-Sleep Pseudocode

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$e \leftarrow 0$
$\mathcal{L}_{prev} \leftarrow \infty$
while $e < L$ do                                          ▷ Repeat for $L$ data epochs
    for $t$ in range$(0, T_w)$ do                              ▷ Wake Phase
        for $k$ in range$(0, K)$ do                          ▷ Sample network states
            $\mathbf{r}^{(k)} \sim b(\mathbf{r}, \theta_b)$
            if epoch is complete then $e \leftarrow e + 1$
            end if
        end for
        $\mathcal{L}(\theta_p) \leftarrow \frac{1}{K} \sum_{k=0}^{K} - \log p(\mathbf{r}^{(k)}, \theta_p)$     ▷ Update generative parameters $\theta_p$
        $\Delta\theta_p \leftarrow \eta_p \nabla_{\theta_p} \mathcal{L}(\theta_p)$
        $\theta_p \leftarrow$ Adam$(\theta_p, \Delta\theta_p)$
    end for
    if $\mathcal{L}(\theta_p) < \mathcal{L}_{prev}$ then
        $\mathcal{L}_{prev} \leftarrow \mathcal{L}(\theta_p)$
        for $t$ in range$(0, T_s)$ do                          ▷ Sleep Phase
            for $k$ in range$(0, K)$ do                      ▷ Sample network states
                $\mathbf{r}^{(k)} \sim p(\mathbf{r}, \theta_p)$
            end for
            $\mathcal{L}(\theta_b) \leftarrow \frac{1}{K} \sum_{k=0}^{K} - \log b(\mathbf{r}^{(k)}, \theta_b)$     ▷ Update inference parameters $\theta_b$
            $\Delta\theta_b \leftarrow \eta_b \nabla_{\theta_b} \mathcal{L}(\theta_b)$
            $\theta_b \leftarrow$ Adam$(\theta_b, \Delta\theta_b)$
        end for
    end if
end while
```