(a)
$$1 \qquad \frac{\partial \vec{s}_{i}}{\partial \vec{s}_{0}} \qquad \frac{\partial \vec{s}_{i+1}}{\partial \vec{s}_{0}} = \frac{\partial \vec{s}_{i+1}}{\partial \vec{s}_{i}} \frac{\partial \vec{s}_{i}}{\partial \vec{s}_{0}} \qquad \frac{\partial \vec{s}_{n}}{\partial \vec{s}_{0}} \qquad \frac{\partial \mathcal{L}}{\partial \vec{s}_{0}}$$

$$(b) \qquad \partial \mathcal{L} \qquad \partial \mathcal{L}$$

$$(b) \qquad \partial \mathcal{L} \qquad \partial \mathcal{L}$$

(b)
$$\frac{\partial \mathcal{L}}{\partial \vec{s}_{0}}$$
 $\frac{\partial \mathcal{L}}{\partial \vec{s}_{i}} = \frac{\partial \mathcal{L}}{\partial \vec{s}_{i+1}} \frac{\partial \vec{s}_{i+1}}{\partial \vec{s}_{i}}$ $\frac{\partial \mathcal{L}}{\partial \vec{s}_{i+1}}$ $\frac{\partial \mathcal{L}}{\partial \vec{s}_{n}}$ 1 \vec{s}_{0} $\vec{s}_$