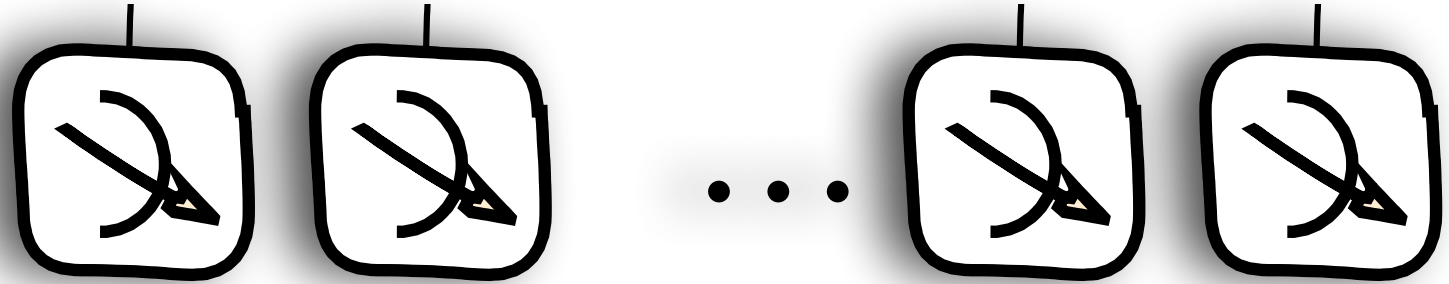

Jack Y. Araz

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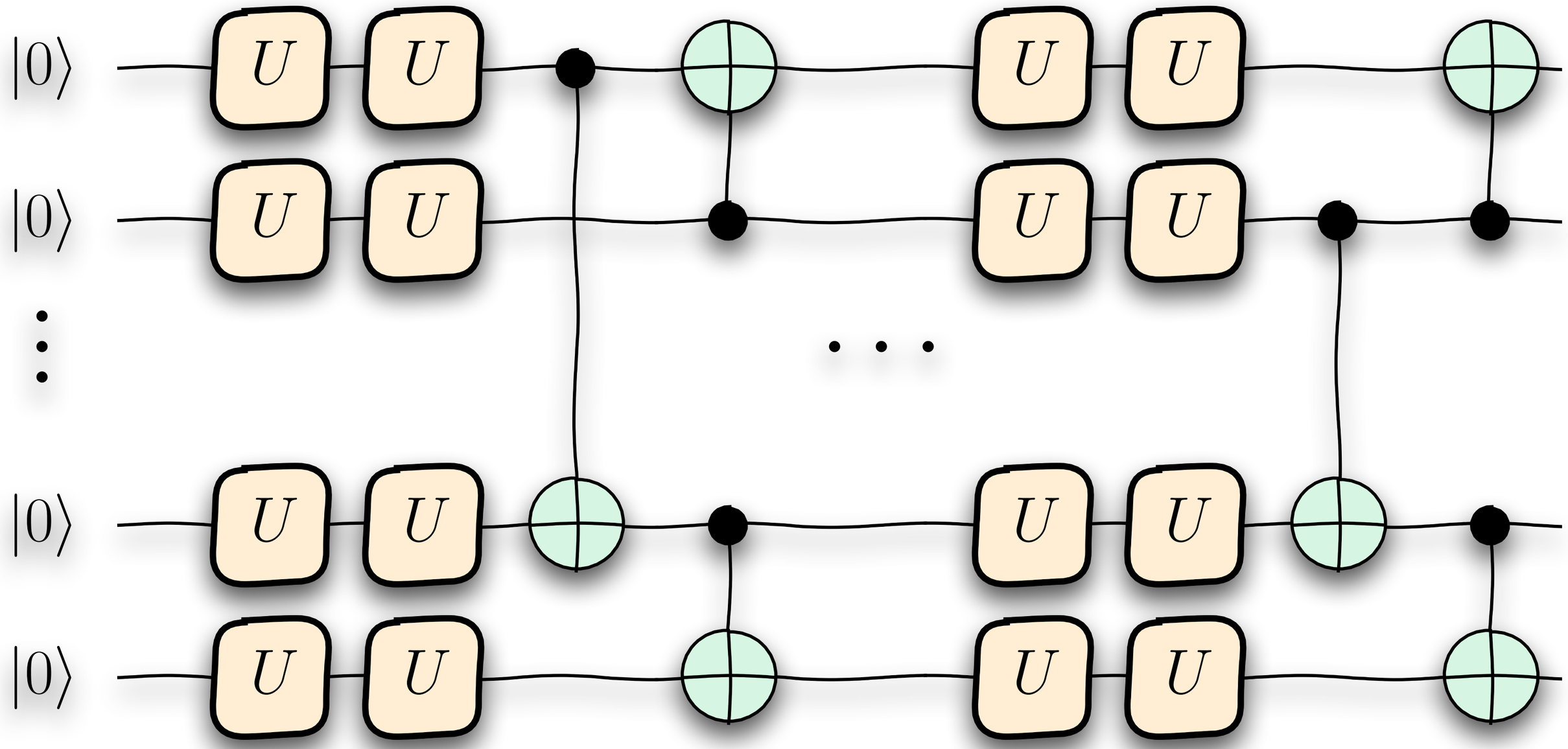
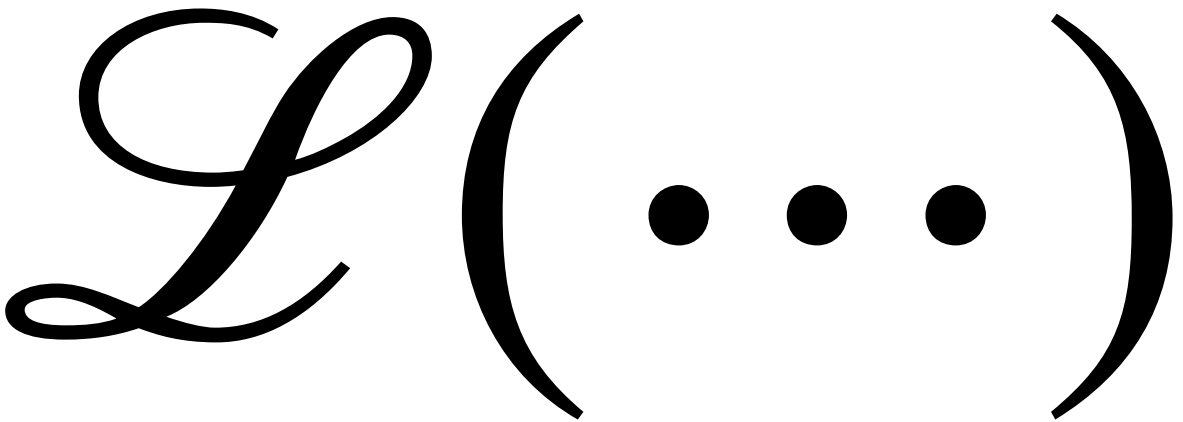
Jefferson Lab
EXPLORING THE NATURE OF MATTER


OLD DOMINION UNIVERSITY
1930

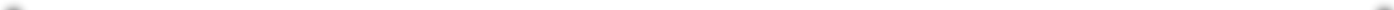
State preparation: $U(\theta)\,|0\cdots\rangle$

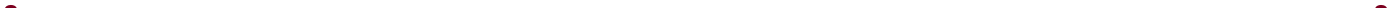

$|0\rangle$
$|0\rangle$
$|0\rangle$
$|0\rangle$
U

$$f(\mathbf{x}; \theta)$$



Update rotation angles





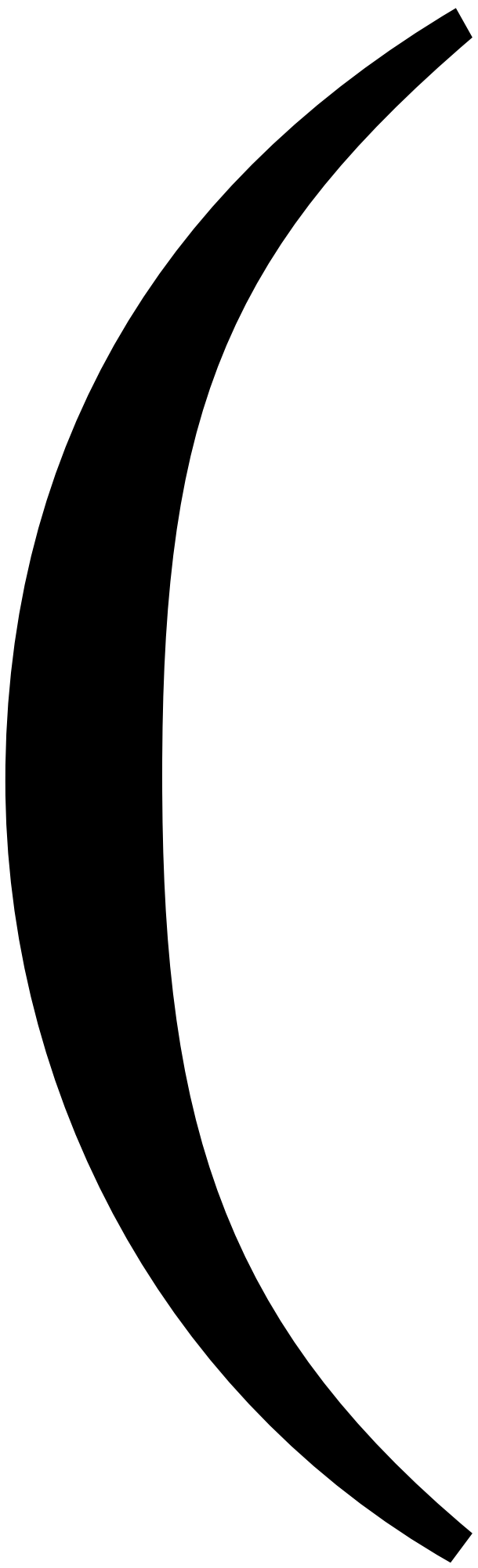
State preparation:

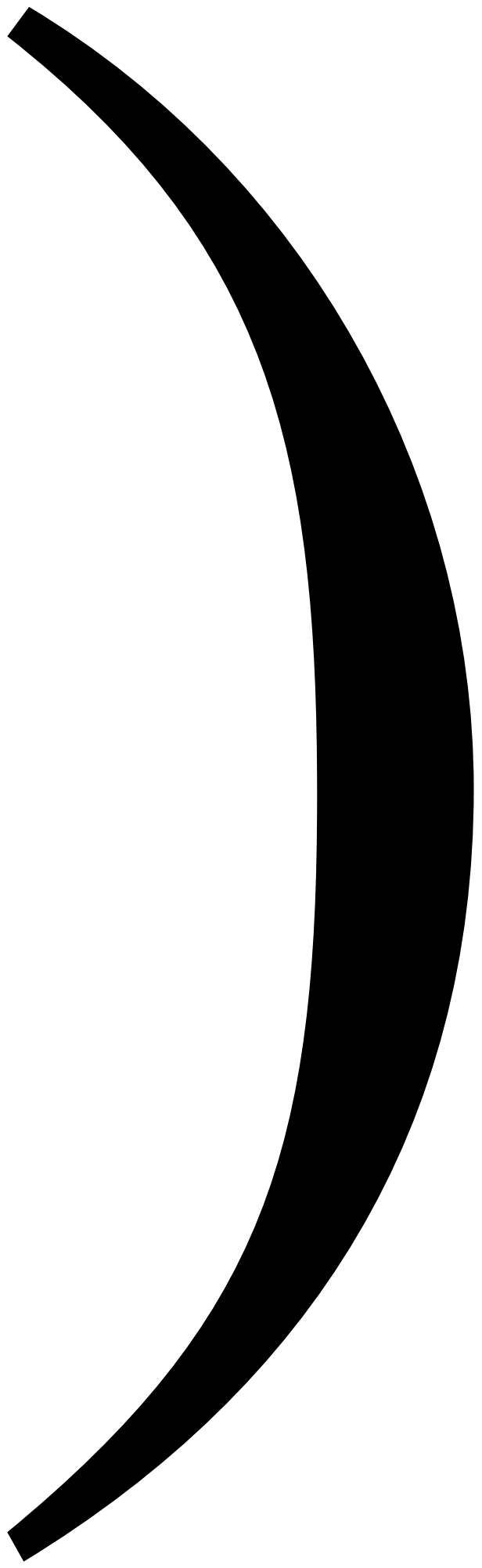

$U(\theta) \mid 0 \cdots \rangle$

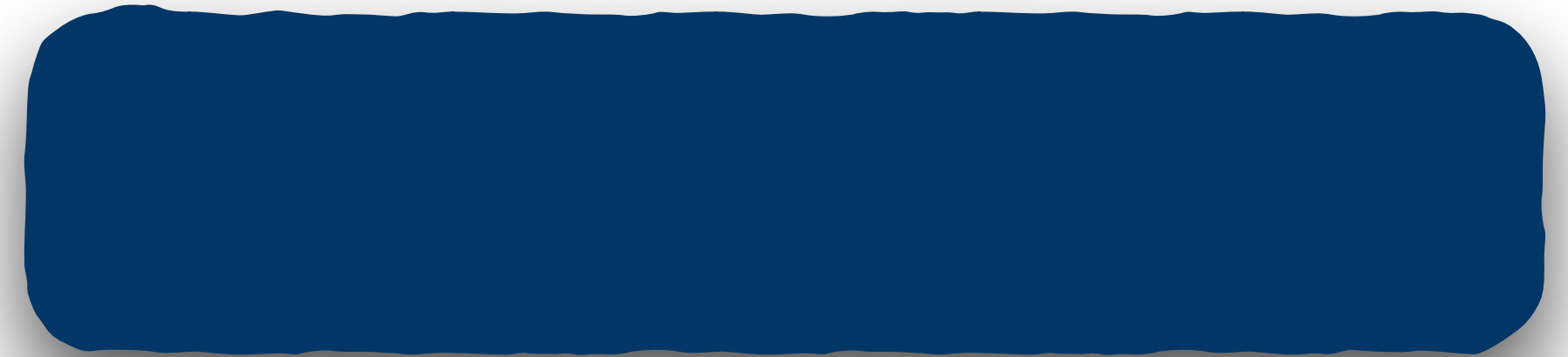
$$\nabla_\theta f(\theta) = \frac{1}{2}\left[f(\theta + \varepsilon) - f(\theta - \varepsilon)\right]$$

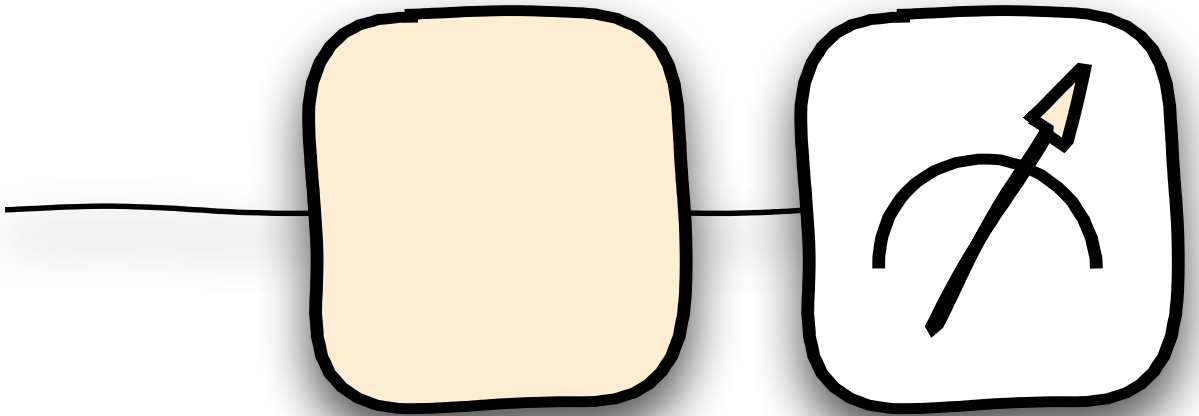
Quantum computer can not compute gradients!

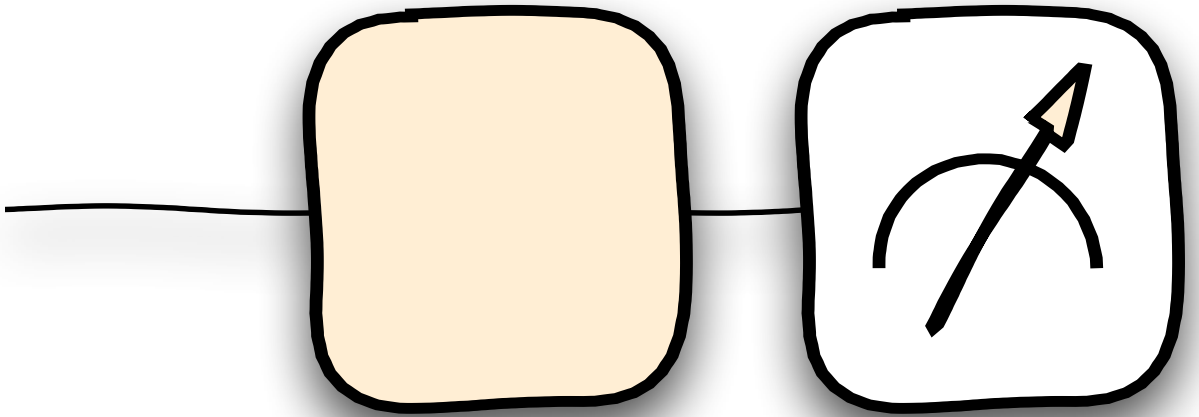
$$\nabla_\theta f(\theta) = \frac{1}{2}$$











$$R_Y(\theta + \varepsilon)$$

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