

$$\dot{\mathcal{V}}_t = \mathcal{H}_t \mathcal{V}_t$$

$$\mathcal{V}_t = \sum_n^{\mathbb{N}} \int_{dt_1} \cdots \int_{dt_n}^{t \geq t_1 \geq \cdots \geq t_n \geq s} \mathcal{H}_{t_1} \cdots \mathcal{H}_{t_n} \mathcal{V}_s = \sum_n^{\mathbb{N}} \int_{dt_1} \cdots \int_{dt_n}^{\overline{s|t}^{\mathcal{N}}} \mathcal{H}_{t_1} \cdots \mathcal{H}_{t_n} \mathcal{V}_s = \overleftarrow{\exp \int_{s|t}^{d\tau} \mathcal{H}_\tau} \mathcal{V}_s$$

$$\mathcal{V}_t = \mathcal{V}_s + \int_{dt_1}^{s|t} \mathcal{H}_{t_1} \mathcal{V}_{t_1} = \mathcal{V}_s + \int_{dt_1}^{s|t} \mathcal{H}_{t_1} \mathcal{V}_s + \underbrace{\int_{dt_2}^{s|t_1} \mathcal{H}_{t_2} \mathcal{V}_{t_2}}_{\mathcal{V}_s} = \mathcal{V}_s + \int_{dt_1}^{s|t} \mathcal{H}_{t_1} \mathcal{V}_s + \underbrace{\int_{dt_2}^{s|t_1} \mathcal{H}_{t_2} \mathcal{V}_s + \int_{dt_3}^{s|t_2} \mathcal{H}_{t_3} \mathcal{V}_{t_3}}_{\mathcal{V}_s}$$

$$= \mathcal{V}_s + \underbrace{\int_{dt_1}^{s|t} \mathcal{H}_{t_1} \mathcal{V}_s + \int_{dt_2}^{s|t_1} \mathcal{H}_{t_2} \mathcal{V}_s + \int_{dt_3}^{s|t_2} \mathcal{H}_{t_3} \mathcal{V}_s}_{\mathcal{V}_s} + \cdots$$

$$= \mathcal{V}_s + \int_{dt_1}^{s|t} \mathcal{H}_{t_1} \mathcal{V}_s + \int_{dt_1}^{s|t} \mathcal{H}_{t_1} \int_{dt_2}^{s|t_1} \mathcal{H}_{t_2} \mathcal{V}_s + \int_{dt_1}^{s|t} \mathcal{H}_{t_1} \int_{dt_2}^{s|t_1} \mathcal{H}_{t_2} \int_{dt_3}^{s|t_2} \mathcal{H}_{t_3} \mathcal{V}_s + \cdots$$

$$= \mathcal{V}_s + \sum_{1 \leq n} \int_{dt_1}^{s|t} \mathcal{H}_{t_1} \int_{dt_2}^{s|t_1} \mathcal{H}_{t_2} \cdots \int_{dt_n}^{s|t_{n-1}} \mathcal{H}_{t_n} \mathcal{V}_s = I + \sum_{1 \leq n} \overbrace{\int_{dt_1}^{s|t} \mathcal{H}_{t_1} \int_{dt_2}^{s|t_1} \mathcal{H}_{t_2} \cdots \int_{dt_n}^{s|t_{n-1}} \mathcal{H}_{t_n}}^{\mathcal{V}_s} \mathcal{V}_s$$

$$= \sum_n^{\mathbb{N}} \int_{dt_1} \cdots \int_{dt_n}^{t \geq t_1 \geq \cdots \geq t_n \geq s} \mathcal{H}_{t_1} \cdots \mathcal{H}_{t_n} \mathcal{V}_s = \sum_n^{\mathbb{N}} \int_{dt_1} \cdots \int_{dt_n}^{\overline{s|t}^{\mathcal{N}}} \mathcal{H}_{t_1} \cdots \mathcal{H}_{t_n} \mathcal{V}_s = \overleftarrow{\exp \int_{s|t}^{d\tau} \mathcal{H}_\tau} \mathcal{V}_s$$

$$\mathcal{V}_t = \sum_n^{\mathbb{N}} \int_{dt_1} \cdots \int_{dt_n}^{t \geq t_1 \geq \cdots \geq t_n \geq 0} \mathcal{H}_{t_1} \cdots \mathcal{H}_{t_n} \mathcal{V}_0 = \sum_n^{\mathbb{N}} \int_{dt_1} \cdots \int_{dt_n}^{\overline{0|t}^{\mathcal{N}}} \mathcal{H}_{t_1} \cdots \mathcal{H}_{t_n} \mathcal{V}_0 = \overleftarrow{\exp \int_{0|t}^{d\tau} \mathcal{H}_\tau} \mathcal{V}_0$$