$$\int_0^t s\exp(W_x s)\,ds =$$

$$\int_0^t s + W_x s^2 + \frac{1}{2} W_x^2 s^3 + \frac{1}{3!} W_x^3 s^4 + \cdots ds =$$

$$\int_0^t \sum_{k=0}^{\infty} \frac{1}{k!} s \cdot (W_x s)^k ds =$$

$$\sum_{k=0}^{\infty} \int_0^t \frac{1}{k!} s (W_x s)^k ds =$$

$$\sum_{k=0}^{\infty} \frac{1}{k!} W_x^k \int_0^t s^{k+1} ds =$$

$$\sum_{k=0}^{\infty} \frac{1}{k!} W_x^k \frac{1}{(k+2)} t^{k+2} =$$

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$$\sum_{k=0}^{\infty} \frac{1}{k!(k+2)} W_x^k t^{k+2} =$$

$$-W_x = \frac{W_x^3}{\|w\|^2}$$

$$\sum_{k=0}^{\infty} \frac{k+1}{(k+2)!} \frac{-W_x}{\|w\|^2} (W_x t)^{k+2} =$$

$$\sum_{k=1}^{\infty} \frac{k}{(k+1)!} t^{k+1}$$

$$\frac{-W_x}{\|w\|^2} \sum_{k=1}^{\infty} \frac{k}{(k+1)!} (W_x t)^{k+1} =$$

$$= e^t(t-1)+1$$

for scalar

$$-\frac{W_x}{\|w\|^2}\left(\exp(W_x t)(W_x t - I) + I\right)$$

$$\sum_{k=1}^{\infty} \frac{k}{(k+1)!} A^{k+1}$$

$$= e^A(A-I)+I$$

for matrix