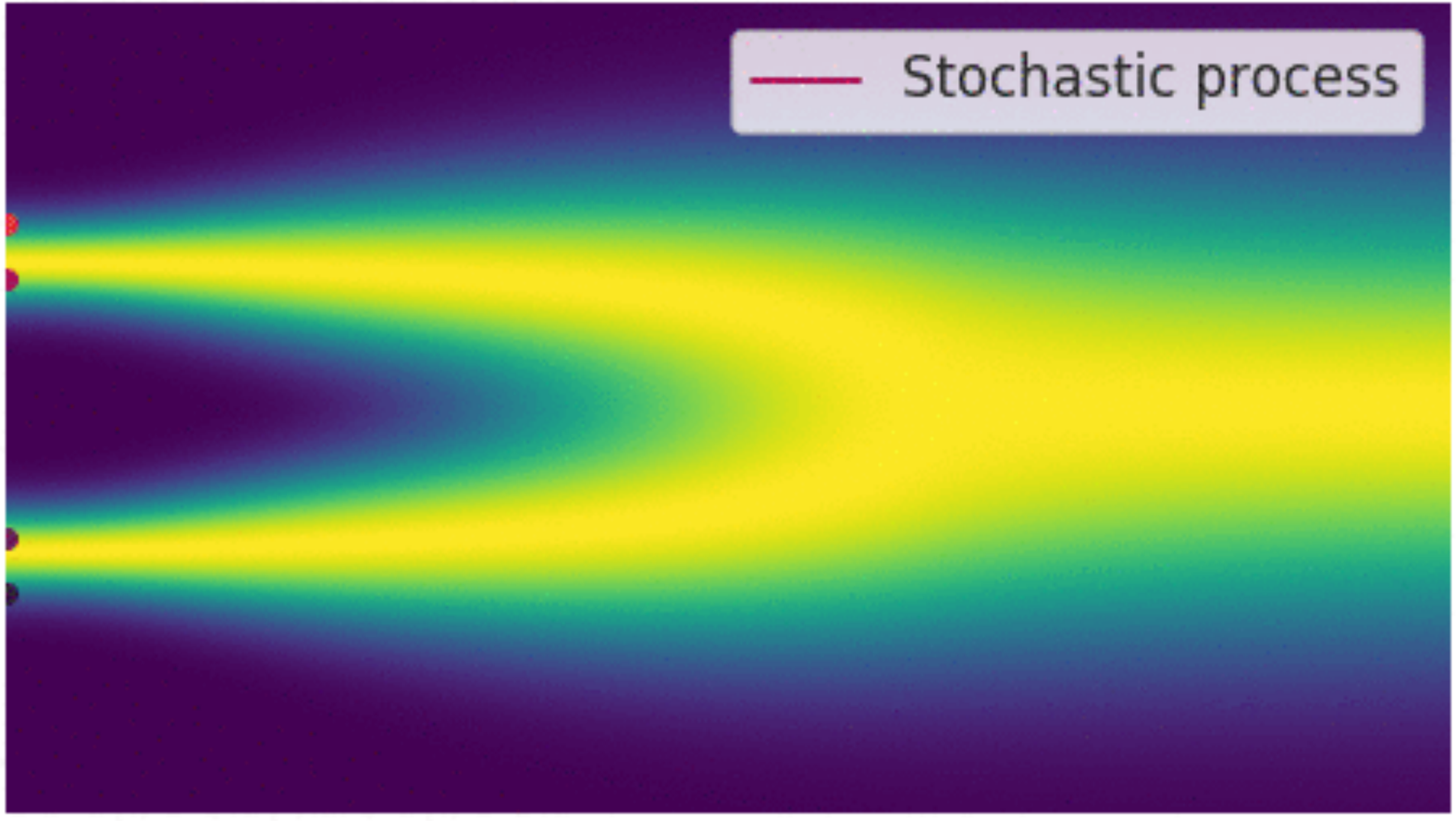
/70

43

Continuous-time/SDE formulation

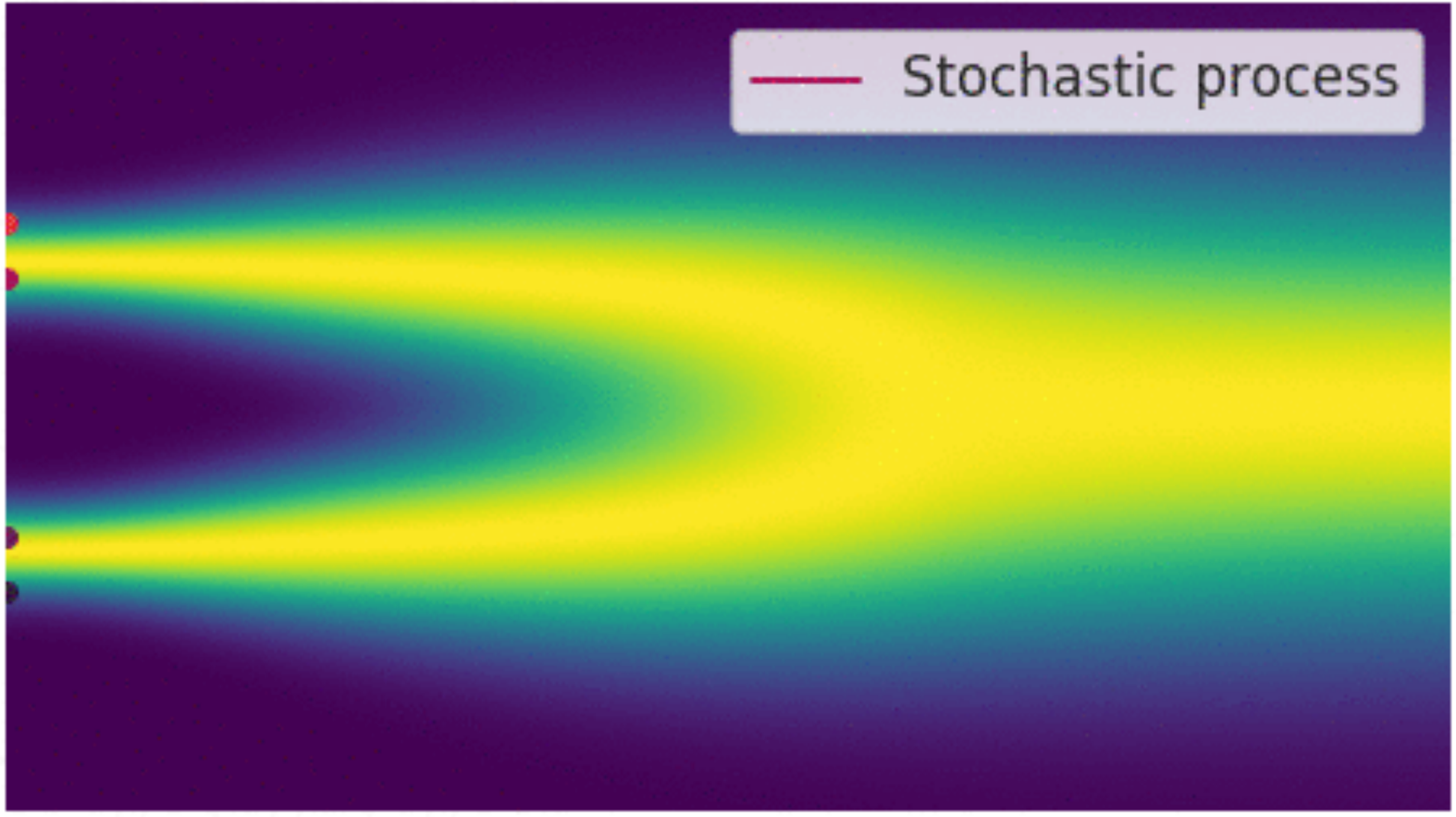

Stochastic process

$$\mathrm{d}x_t = -\frac{1}{2}\beta(t)x_t\ \mathrm{d}t + \sqrt{\beta(t)}\mathrm{d}w_t$$

The forward diffusion process defined by an SDE

[Song et al 2021]

https://yang-song.net/blog/2021/score/

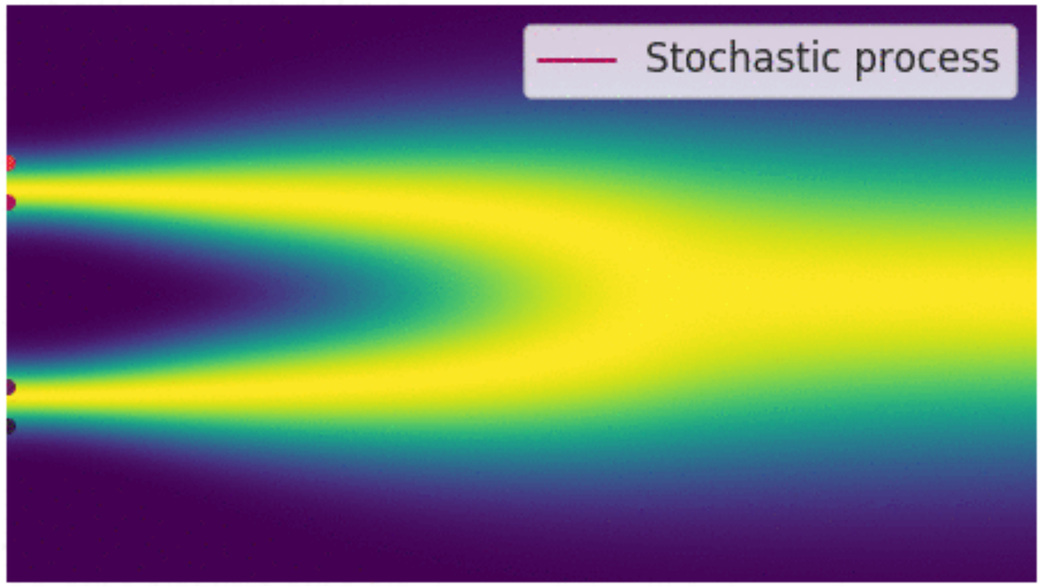

Stochastic process

Continuous-time/SDE formulation

[Song et al 2021]

https://yang-song.net/blog/2021/score/

The forward diffusion process defined by an SDE



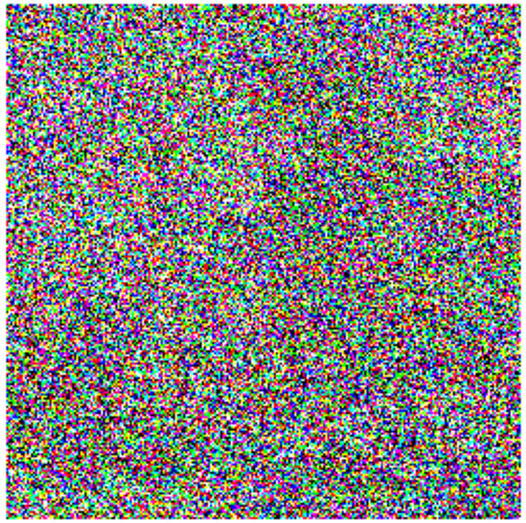
$$\mathrm{d}x_t = -\frac{1}{2}\beta(t)x_t\ \mathrm{d}t + \sqrt{\beta(t)}\mathrm{d}w_t$$

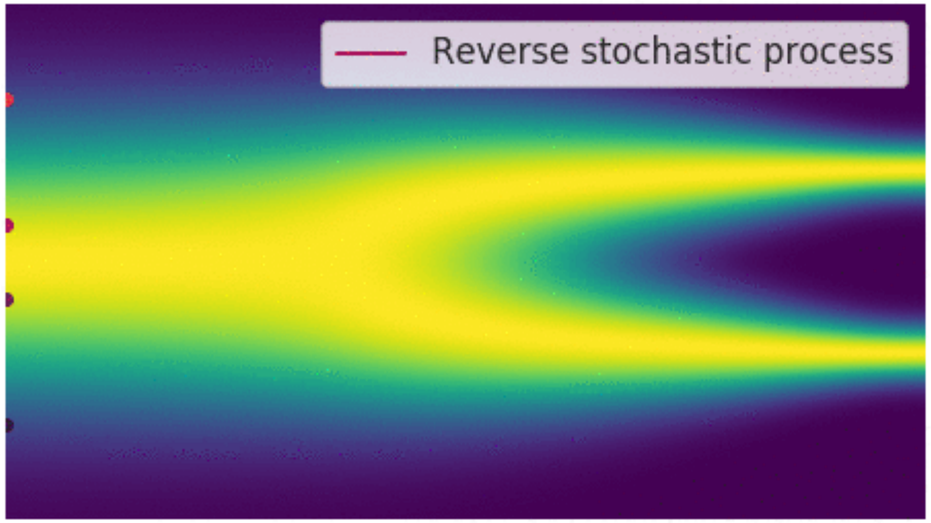
The reverse SDE

https://yang-song.net/blog/2021/score/

The reverse process satisfies a reverse-time SDE that can be derived from the forward SDE and the score of the marginal distribution, $\nabla_{x_t} \log q(x_t)$

[Song et al 2021]





$$\mathrm{d}x_t = \left[-\frac{1}{2}\beta(t)x_t - \beta(t)\,\nabla_{x_t}\log q\left(x_t\right)\right]\mathrm{d}t + \sqrt{\beta(t)}\mathrm{d}w_t$$