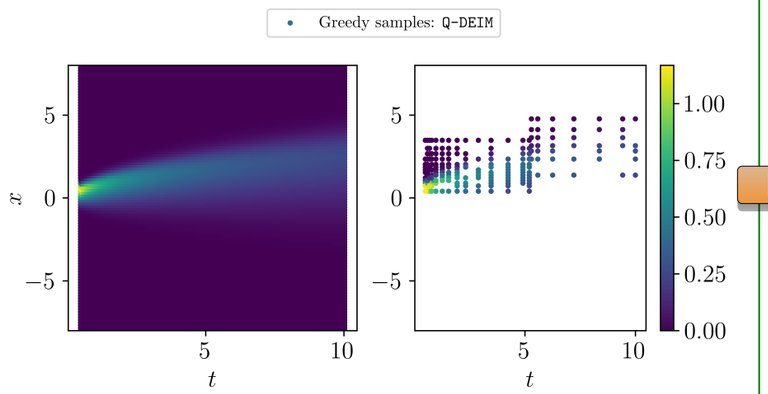
a

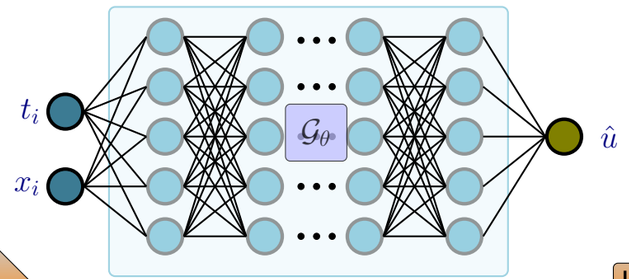
Dataset



Data

b

Network for implicit representation



$$\frac{\partial \hat{u}}{\partial t} = \begin{bmatrix} 1 & u_x & u_{xx} & \cdots & uu_x & \cdots & u^2u_{xxx} \end{bmatrix} \xi$$

Optimizing parameters

c

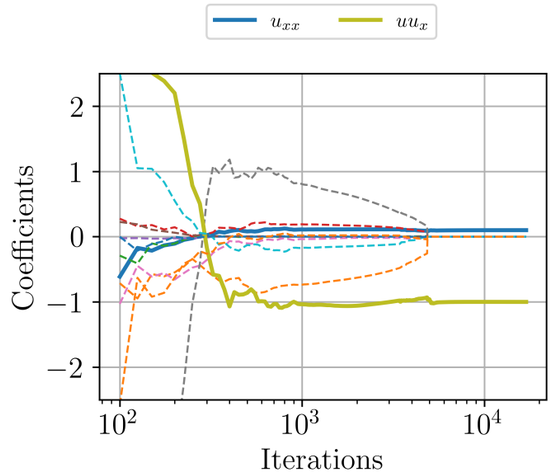
Objective (loss) function

$$\mathcal{L} = \frac{1}{\mathcal{N}} \sum_{i=1}^{\mathcal{N}} \left(\mathbf{u}(t_i, x_i) - \hat{\mathbf{u}}(t_i, x_i) \right)^2 + \frac{1}{\mathcal{N}} \sum_{i=1}^{\mathcal{N}} \left(\frac{\partial \hat{\mathbf{u}}(t_i, x_i)}{\partial t_i} - \boldsymbol{\Theta}\big(\hat{\mathbf{u}}(t_i, x_i)\big)\xi \right)^2,$$

Learned

d

Learned coefficient vector



Θ	ξ
1	0.000
u_x	0.000
u_{xx}	0.100
u_{xxx}	0.000
u	0.000
uu_x	-0.999
uu_{xx}	0.000
uu_{xxx}	0.000
u^2	0.000
u^2u_x	0.000
u^2u_{xx}	0.000
u^2u_{xxx}	0.000