

# Unstaffed UAT to DeepONet

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8:39 PM

UAT

build network

$$G(u)(y) = \sum_{k=1}^p \left[ \sum_{i=1}^n c_i^k \sigma \left( \sum_{j=1}^d f_{ij}^k u(x_j) + \theta_i^k \right) \right] \sigma(w_k \cdot y + s_k) \leq \epsilon$$

The network:

Branch network

Full network

$$\left[ \sum_{i=1}^n c_i^k \sigma \left( \sum_{j=1}^d f_{ij}^k u(x_j) + \theta_i^k \right) \right] \cdot \sigma(w_k \cdot y + s_k)$$

One layer within branch

all layers within one branch network

"frunk" network  
learning association  
for output location  $y$   
and labelled data

Encode  $y$   
and output

$$T = \begin{bmatrix} t_1 \\ \vdots \\ t_p \end{bmatrix}$$

$$T = \begin{bmatrix} t_1 \\ t_2 \\ t_3 \\ \vdots \\ t_p \end{bmatrix}$$

Encode input  
function and  
all pts

$$B = \begin{bmatrix} b_1 \\ \vdots \\ b_p \end{bmatrix}$$

$$\sum b_1 t_1 + b_2 t_2 \dots$$

$$A(u)(y) \approx \sum b_k \cdot t_k$$

UAT

$$B \cdot T = \sum_{k=1}^p b_k \cdot t_k$$

$$B \cdot T \approx G(u)(y)$$

(unstacked)

$$B = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ \vdots \\ b_p \end{bmatrix}$$

Inner product operation

or sub network outputs

Deep Onet