

Project 03

weekly report

model in the tutorial



best performance model



Dataset	FNO	TFNO	Unet	CNextU-net
active_matter	0.3691	0.3598	0.2489	0.1034

Table: VRMSE metrics on test sets (lower is better). Best results are shown in bold. VRMSE is scaled such that predicting the mean value of the target field results in a score of 1.

Baseline model (FNO)

- FNO
 - Spectral filter size (modes) - 16
 - Hidden dimension - 128
 - Blocks - 4

Fourier Neural Operator

Implementation of the [Fourier Neural Operator](#) provided by [neuraloperator v0.3.0](#).

Model Details

For benchmarking on the Well, we used the following parameters.

Parameters	Values
Modes	16
Blocks	4
Hidden Size	128

Dataset	Best Learning Rate	Epochs	VRMSE
acoustic_scattering_maze	1E-3	27	0.5033
active_matter	5E-3	239	0.3157

Baseline model (CNextU-net)

- CNextU-net
 - Spatial filter size - 7
 - Initial dimension - 42
 - Blocks per stage - 2
 - Up/Down blocks - 4
 - Bottleneck blocks - 1

CNextU-Net

Implementation of the [U-Net model](#) using [ConvNext blocks](#).

Model Details

For benchmarking on the Well, we used the following parameters.

Parameters	Values
Spatial Filter Size	7
Initial Dimension	42
Block per Stage	2
Up/Down Blocks	4
Bottleneck Blocks	1

Dataset	Learning Rate	Epoch	VRMSE
acoustic_scattering_maze	1E-3	10	0.0196
active_matter	5E-3	156	0.0953

Pseudocode:

- Import the_well.benchmark.models
- Load train set (4 input - 1 output)
- Initialise the model with given parameters
- Train with train set
- Load valid set
- Use valid set to get metrics