

# 0809-sh\_em\_1qm\_v2

August 10, 2023

```
[ ]: initial_path = 'peptide-QML/'  
# initial_path = '../'
```

```
[ ]: day = "0809"  
name_notebook = day + "-sh_em_1qm_v2.ipynb"  
  
#ask the user if that is correct, if he says yes kkeep going, otherwise stop  
import sys  
answer = input("{} is the name of the notebook | Is that correct? (y/n): ".  
    ↳format(name_notebook))  
if answer != "y":  
    print("Please, change the name of the notebook")  
    sys.exit()
```

```
[ ]: import numpy as np
```

```
[ ]: import sys  
sys.path.append(initial_path)  
  
%load_ext autoreload  
%autoreload 2  
from my_code import functions as f  
from my_code import pytorch_model as ptm  
from my_code import quantum_nodes as qn  
from my_code import pytorch_wrappers as pw
```

## 1 Data

```
[ ]: data_file_path = initial_path + 'data/Scores/PET/generated/  
    ↳bb14_Strings_Energies_10_000_4_aa.txt' # Replace with the actual path to_  
    ↳your 'data.txt' file  
string_list, number_list = f.read_data_file(data_file_path)  
score_list = np.array(number_list)/1000  
vector_list = np.array([f.string_to_numbers(string) for string in string_list])_  
    ↳# one hot encoding
```

```
[ ]: X, Y, X_validation, Y_validation = f.create_validating_set(vector_list,
    ↪score_list, percentage=0.1)

[ ]: # Define the dataset
input_data = ptm.torch.tensor(X)
target_data = ptm.torch.tensor(Y).view(-1, 1)

# Define the validation set
input_validation = ptm.torch.tensor(X_validation)
target_validation = ptm.torch.tensor(Y_validation).view(-1, 1)

[ ]: input_data.shape, target_data.shape, input_validation.shape, target_validation.
    ↪shape

[ ]: (torch.Size([9000, 4]),
    torch.Size([9000, 1]),
    torch.Size([1000, 4]),
    torch.Size([1000, 1]))
```

## 2 Quantum node

```
[ ]: n_aminoacids = len(string_list[0])

[ ]: quantum_layer = qn.circuit(
    n_qubits = n_aminoacids,
    device = "default.qubit.torch",
    device_options = {'shots': None},
    embedding = qn.parts.AngleEmbedding,
    embedding_ansatz = qn.parts.Ansatz_11,
    block_ansatz = qn.parts.Ansatz_11,
    measurement = qn.parts.Measurement('Z', 1),
    embedding_n_layers = 4,
    different_inputs_per_layer = True,
    block_n_layers = 50,
    # wrapper_qlayer = pw.QLayer,
    wrapper_qlayer = None,
)

[ ]: quantum_layer.weights_shape, quantum_layer.input_shape

[ ]: ({'embedding_weights': (48,)}, {'block_weights': (600,)}), (20,))

[ ]: quantum_layer.draw(size=(50,3))
```

```
/usr/lib/python3.8/_collections_abc.py:832: MatplotlibDeprecationWarning:
The examples.directory rcparam was deprecated in Matplotlib 3.0 and will be
removed in 3.2. In the future, examples will be found relative to the 'datapath'
```

```

self[key] = other[key]
/usr/lib/python3.8/_collections_abc.py:832: MatplotlibDeprecationWarning:
The savefig.frameon rcparam was deprecated in Matplotlib 3.1 and will be removed
in 3.3.
    self[key] = other[key]
/usr/lib/python3.8/_collections_abc.py:832: MatplotlibDeprecationWarning:
The text.latex.unicode rcparam was deprecated in Matplotlib 3.0 and will be
removed in 3.2.
    self[key] = other[key]
/usr/lib/python3.8/_collections_abc.py:832: MatplotlibDeprecationWarning:
The verbose.fileo rcparam was deprecated in Matplotlib 3.1 and will be removed
in 3.3.
    self[key] = other[key]
/usr/lib/python3.8/_collections_abc.py:832: MatplotlibDeprecationWarning:
The verbose.level rcparam was deprecated in Matplotlib 3.1 and will be removed
in 3.3.
    self[key] = other[key]

```

### 3 Hybrid model

```
[ ]: import torch.nn as nn
import torch
class ClippedReLU(nn.Module):
    def __init__(self, clip_val=1):
        super(ClippedReLU, self).__init__()
        self.clip_val = clip_val

    def forward(self, x):
        return torch.clamp(x, 0, self.clip_val)

class Reshape(nn.Module):
    def __init__(self):
        super(Reshape, self).__init__()

    def forward(self, x):
```

```

        dims = len(x.shape)
        return torch.transpose(x, dims-2, dims-1).reshape(x.shape[-3] if
↪dims==3 else 1, x.shape[-2]*x.shape[-1]).squeeze()

```

```

[ ]: layers = [ptm.nn.Embedding(num_embeddings=19, embedding_dim=quantum_layer.
↪input_shape[0]//n_aminoacids), Reshape()]
layers += [quantum_layer(), ptm.nn.Linear(1,1)]

```

```

[ ]: # layers = []
# for i in range(1, len(layers_dim)):
#     layers += [ptm.nn.Linear(layers_dim[-1*i], layers_dim[-1*(i+1)]), ptm.nn.
↪ReLU()]
# layers += [ptm.nn.Linear(layers_dim[0], layers_dim[0]), ClippedReLU()]
# layers += [quantum_layer()]
# # layers += [nn.Linear(1, 1)]
# # layers += [nn.Linear(2, 4), nn.ReLU()]
# # layers += [nn.Linear(4, 1)]

```

```

[ ]: # Create model and set data:
model = ptm.pytorch_model(
    layers,
    save_options = {'initial_path': initial_path, 'name_notebook':
↪name_notebook},
)
model.set_data(
    data_X=input_data,
    data_Y=target_data,
    data_X_validation=input_validation,
    data_Y_validation=target_validation
)

```

```

[ ]: x = model.model[0](input_data[0:2])
print(x, x.shape)

x = model.model[1](x)
print(x, x.shape)

x = model.model[2](x)
print(x)

```

```

tensor([[[[-0.0938, -0.1924,  0.9664,  0.7968, -0.6859],
          [-1.3704,  1.0478,  0.7359, -0.2775,  0.6105],
          [-0.4289,  1.6409, -1.0753, -1.3990, -1.0522],
          [ 1.0692, -0.3417,  0.3549, -1.3462,  0.8673]],

        [[ 0.5060, -0.9251,  0.2737, -0.3624,  1.6683],
          [-0.4903,  0.4119,  0.1776,  0.4593,  0.2890],
          [-0.1345,  0.0136,  0.3824,  0.7860, -0.9331],

```

```

        [-0.4289, 1.6409, -1.0753, -1.3990, -1.0522]]],
        grad_fn=<EmbeddingBackward>) torch.Size([2, 4, 5])
tensor([[[-0.0938, -1.3704, -0.4289, 1.0692, -0.1924, 1.0478, 1.6409, -0.3417,
          0.9664, 0.7359, -1.0753, 0.3549, 0.7968, -0.2775, -1.3990, -1.3462,
          -0.6859, 0.6105, -1.0522, 0.8673],
         [ 0.5060, -0.4903, -0.1345, -0.4289, -0.9251, 0.4119, 0.0136, 1.6409,
          0.2737, 0.1776, 0.3824, -1.0753, -0.3624, 0.4593, 0.7860, -1.3990,
          1.6683, 0.2890, -0.9331, -1.0522]]], grad_fn=<SqueezeBackward0>)
torch.Size([2, 20])
tensor([[ 0.1108],
        [-0.0068]], grad_fn=<ViewBackward>)

```

```

[ ]: for i in range(2):
    x = model.model[0](input_data[i])
    print(x, x.shape)

    x = model.model[1](x)
    print(x, x.shape)

    x = model.model[2](x)
    print(i, x)

```

```

tensor([[[-0.0938, -0.1924, 0.9664, 0.7968, -0.6859],
         [-1.3704, 1.0478, 0.7359, -0.2775, 0.6105],
         [-0.4289, 1.6409, -1.0753, -1.3990, -1.0522],
         [ 1.0692, -0.3417, 0.3549, -1.3462, 0.8673]],
        grad_fn=<EmbeddingBackward>) torch.Size([4, 5])
tensor([[[-0.0938, -1.3704, -0.4289, 1.0692, -0.1924, 1.0478, 1.6409, -0.3417,
          0.9664, 0.7359, -1.0753, 0.3549, 0.7968, -0.2775, -1.3990, -1.3462,
          -0.6859, 0.6105, -1.0522, 0.8673], grad_fn=<SqueezeBackward0>)
torch.Size([20])
0 tensor([0.1108], grad_fn=<CatBackward>)
tensor([[ 0.5060, -0.9251, 0.2737, -0.3624, 1.6683],
        [-0.4903, 0.4119, 0.1776, 0.4593, 0.2890],
        [-0.1345, 0.0136, 0.3824, 0.7860, -0.9331],
        [-0.4289, 1.6409, -1.0753, -1.3990, -1.0522]],
        grad_fn=<EmbeddingBackward>) torch.Size([4, 5])
tensor([ 0.5060, -0.4903, -0.1345, -0.4289, -0.9251, 0.4119, 0.0136, 1.6409,
        0.2737, 0.1776, 0.3824, -1.0753, -0.3624, 0.4593, 0.7860, -1.3990,
        1.6683, 0.2890, -0.9331, -1.0522], grad_fn=<SqueezeBackward0>)
torch.Size([20])
1 tensor([-0.0068], grad_fn=<CatBackward>)

```

```

[ ]: print(model(input_data[0:2]))
     print(model(input_data[1]))

```

```

tensor([[[-0.2511],
         [-0.1603]], grad_fn=<AddmmBackward>)
tensor([-0.1603], grad_fn=<AddBackward0>)

```

```
[ ]: model.keep_track_params=True,
```

```
[ ]: import torch.optim as optim

# ask the user if he wants to start the training
out = input("Do you want to start the training? (y/n) ")
if out != 'y':
    sys.exit()

# train the model
model.train(
    optimizer= optim.Adam,
    optimizer_options={'lr': 0.05},
    num_epochs = 50,
    batch_size = 32,
)
```

Epoch [0/50], Loss: 2.2945, Loss validation: 2.3733

/usr/lib/python3/dist-packages/torch/autograd/\_\_init\_\_.py:147: UserWarning: CUDA initialization: Unexpected error from cudaGetDeviceCount(). Did you run some cuda functions before calling NumCudaDevices() that might have already set an error? Error 804: forward compatibility was attempted on non supported HW (Triggered internally at ../c10/cuda/CUDAFunctions.cpp:115.)

Variable.\_execution\_engine.run\_backward(

Validation string,	i: 0;	prediction: -0.1254,	target:
-0.0624,	loss: 1.0094		

Validation string,	i: 1;	prediction: -0.0755,	target:
-0.0652,	loss: 0.1586		

Validation string,	i: 2;	prediction: -0.0535,	target:
-0.0381,	loss: 0.4052		

Epoch [1/50], Loss: 0.8431, Loss validation: 0.7170, Time remaining: ~1.0h 52.0m 16s

Validation string,	i: 0;	prediction: 0.0217,	target:
-0.0624,	loss: 1.3475		

Validation string,	i: 1;	prediction: 0.0010,	target:
-0.0652,	loss: 1.0152		

Validation string,	i: 2;	prediction: 0.0175,	target:
-0.0381,	loss: 1.4584		

Epoch [2/50], Loss: 0.6409, Loss validation: 0.6711, Time remaining: ~1.0h 41.0m 6s

Validation string,	i: 0;	prediction: -0.0594,	target:
-0.0624,	loss: 0.0485		

Validation string,	i: 1;	prediction: -0.0410,	target:
-0.0652,	loss: 0.3716		

Validation string,	i: 2;	prediction: -0.0523,	target:
-0.0381,	loss: 0.3743		

Epoch [3/50], Loss: 0.6083, Loss validation: 0.6879, Time remaining: ~1.0h 36.0m

```

17s
    Validation string,      i: 0;  prediction: -0.0672,  target:
-0.0624,      loss: 0.0767
    Validation string,      i: 1;  prediction: -0.0848,  target:
-0.0652,      loss: 0.3013
    Validation string,      i: 2;  prediction: -0.0962,  target:
-0.0381,      loss: 1.5266
Epoch [4/50], Loss: 0.5839, Loss validation: 0.5832, Time remaining: ~1.0h 32.0m
57s
    Validation string,      i: 0;  prediction: -0.0347,  target:
-0.0624,      loss: 0.4446
    Validation string,      i: 1;  prediction: -0.0263,  target:
-0.0652,      loss: 0.5969
    Validation string,      i: 2;  prediction: -0.0642,  target:
-0.0381,      loss: 0.6858
Epoch [5/50], Loss: 0.5539, Loss validation: 0.5839, Time remaining: ~1.0h 30.0m
15s
    Validation string,      i: 0;  prediction: -0.0051,  target:
-0.0624,      loss: 0.9187
    Validation string,      i: 1;  prediction: -0.0373,  target:
-0.0652,      loss: 0.4278
    Validation string,      i: 2;  prediction: -0.0256,  target:
-0.0381,      loss: 0.3265
Epoch [6/50], Loss: 0.5829, Loss validation: 0.6040, Time remaining: ~1.0h 27.0m
51s
    Validation string,      i: 0;  prediction: -0.0868,  target:
-0.0624,      loss: 0.3910
    Validation string,      i: 1;  prediction: -0.0489,  target:
-0.0652,      loss: 0.2500
    Validation string,      i: 2;  prediction: -0.1093,  target:
-0.0381,      loss: 1.8707
Epoch [7/50], Loss: 0.5658, Loss validation: 0.6269, Time remaining: ~1.0h 25.0m
33s
    Validation string,      i: 0;  prediction: -0.0688,  target:
-0.0624,      loss: 0.1016
    Validation string,      i: 1;  prediction: -0.1187,  target:
-0.0652,      loss: 0.8204
    Validation string,      i: 2;  prediction: -0.0680,  target:
-0.0381,      loss: 0.7866
Epoch [8/50], Loss: 0.5405, Loss validation: 0.5853, Time remaining: ~1.0h 23.0m
22s
    Validation string,      i: 0;  prediction: -0.0521,  target:
-0.0624,      loss: 0.1650
    Validation string,      i: 1;  prediction: -0.0446,  target:
-0.0652,      loss: 0.3156
    Validation string,      i: 2;  prediction: -0.0472,  target:
-0.0381,      loss: 0.2386
Epoch [9/50], Loss: 0.5505, Loss validation: 0.5341, Time remaining: ~1.0h 21.0m

```

```

15s
    Validation string,      i: 0;  prediction: 0.0025,    target:
-0.0624,      loss: 1.0396
    Validation string,      i: 1;  prediction: -0.0874,    target:
-0.0652,      loss: 0.3405
    Validation string,      i: 2;  prediction: -0.0310,    target:
-0.0381,      loss: 0.1849
Epoch [10/50], Loss: 0.5641, Loss validation: 0.4858, Time remaining: ~1.0h
19.0m 10s
    Validation string,      i: 0;  prediction: -0.1380,    target:
-0.0624,      loss: 1.2102
    Validation string,      i: 1;  prediction: -0.0816,    target:
-0.0652,      loss: 0.2511
    Validation string,      i: 2;  prediction: -0.1304,    target:
-0.0381,      loss: 2.4250
Epoch [11/50], Loss: 0.5546, Loss validation: 0.5428, Time remaining: ~1.0h
17.0m 7s
    Validation string,      i: 0;  prediction: -0.0750,    target:
-0.0624,      loss: 0.2019
    Validation string,      i: 1;  prediction: -0.0770,    target:
-0.0652,      loss: 0.1812
    Validation string,      i: 2;  prediction: -0.0325,    target:
-0.0381,      loss: 0.1470
Epoch [12/50], Loss: 0.5042, Loss validation: 0.5092, Time remaining: ~1.0h
15.0m 6s
    Validation string,      i: 0;  prediction: -0.0455,    target:
-0.0624,      loss: 0.2709
    Validation string,      i: 1;  prediction: -0.0502,    target:
-0.0652,      loss: 0.2304
    Validation string,      i: 2;  prediction: -0.0717,    target:
-0.0381,      loss: 0.8823
Epoch [13/50], Loss: 0.4977, Loss validation: 0.5697, Time remaining: ~1.0h
13.0m 6s
    Validation string,      i: 0;  prediction: 0.0051,    target:
-0.0624,      loss: 1.0814
    Validation string,      i: 1;  prediction: -0.0174,    target:
-0.0652,      loss: 0.7331
    Validation string,      i: 2;  prediction: -0.0314,    target:
-0.0381,      loss: 0.1748
Epoch [14/50], Loss: 0.4687, Loss validation: 0.6235, Time remaining: ~1.0h
11.0m 7s
    Validation string,      i: 0;  prediction: -0.1255,    target:
-0.0624,      loss: 1.0102
    Validation string,      i: 1;  prediction: -0.0821,    target:
-0.0652,      loss: 0.2600
    Validation string,      i: 2;  prediction: 0.0056,    target:
-0.0381,      loss: 1.1458
Epoch [15/50], Loss: 0.4422, Loss validation: 0.4832, Time remaining: ~1.0h 9.0m

```



```

8s
    Validation string,      i: 0;  prediction: -0.0676,  target:
-0.0624,      loss: 0.0833
    Validation string,      i: 1;  prediction: -0.0704,  target:
-0.0652,      loss: 0.0796
    Validation string,      i: 2;  prediction: -0.0497,  target:
-0.0381,      loss: 0.3063
Epoch [16/50], Loss: 0.4303, Loss validation: 0.3722, Time remaining: ~1.0h 7.0m
9s
    Validation string,      i: 0;  prediction: -0.0832,  target:
-0.0624,      loss: 0.3319
    Validation string,      i: 1;  prediction: -0.0367,  target:
-0.0652,      loss: 0.4376
    Validation string,      i: 2;  prediction: -0.0258,  target:
-0.0381,      loss: 0.3225
Epoch [17/50], Loss: 0.4098, Loss validation: 0.3976, Time remaining: ~1.0h 5.0m
10s
    Validation string,      i: 0;  prediction: -0.0642,  target:
-0.0624,      loss: 0.0282
    Validation string,      i: 1;  prediction: -0.0562,  target:
-0.0652,      loss: 0.1372
    Validation string,      i: 2;  prediction: -0.0572,  target:
-0.0381,      loss: 0.5011
Epoch [18/50], Loss: 0.3897, Loss validation: 0.2649, Time remaining: ~1.0h 3.0m
11s
    Validation string,      i: 0;  prediction: -0.1060,  target:
-0.0624,      loss: 0.6980
    Validation string,      i: 1;  prediction: -0.1451,  target:
-0.0652,      loss: 1.2259
    Validation string,      i: 2;  prediction: -0.1103,  target:
-0.0381,      loss: 1.8963
Epoch [19/50], Loss: 0.3524, Loss validation: 0.6778, Time remaining: ~1.0h 1.0m
13s
    Validation string,      i: 0;  prediction: -0.0698,  target:
-0.0624,      loss: 0.1174
    Validation string,      i: 1;  prediction: -0.0548,  target:
-0.0652,      loss: 0.1586
    Validation string,      i: 2;  prediction: -0.0440,  target:
-0.0381,      loss: 0.1547
Epoch [20/50], Loss: 0.3712, Loss validation: 0.3125, Time remaining: ~0.0h
59.0m 14s
    Validation string,      i: 0;  prediction: -0.0580,  target:
-0.0624,      loss: 0.0713
    Validation string,      i: 1;  prediction: -0.0535,  target:
-0.0652,      loss: 0.1788
    Validation string,      i: 2;  prediction: -0.0568,  target:
-0.0381,      loss: 0.4921
Epoch [21/50], Loss: 0.3462, Loss validation: 0.3727, Time remaining: ~0.0h

```

```

57.0m 16s
    Validation string,      i: 0;  prediction: -0.0555,  target:
-0.0624,      loss: 0.1113
    Validation string,      i: 1;  prediction: -0.0450,  target:
-0.0652,      loss: 0.3096
    Validation string,      i: 2;  prediction: -0.0479,  target:
-0.0381,      loss: 0.2587
Epoch [22/50], Loss: 0.3487, Loss validation: 0.4172, Time remaining: ~0.0h
55.0m 18s
    Validation string,      i: 0;  prediction: -0.0849,  target:
-0.0624,      loss: 0.3596
    Validation string,      i: 1;  prediction: -0.0673,  target:
-0.0652,      loss: 0.0330
    Validation string,      i: 2;  prediction: -0.0602,  target:
-0.0381,      loss: 0.5824
Epoch [23/50], Loss: 0.3558, Loss validation: 0.3375, Time remaining: ~0.0h
53.0m 20s
    Validation string,      i: 0;  prediction: -0.0288,  target:
-0.0624,      loss: 0.5394
    Validation string,      i: 1;  prediction: -0.0616,  target:
-0.0652,      loss: 0.0544
    Validation string,      i: 2;  prediction: -0.0271,  target:
-0.0381,      loss: 0.2882
Epoch [24/50], Loss: 0.3385, Loss validation: 0.3239, Time remaining: ~0.0h
51.0m 23s
    Validation string,      i: 0;  prediction: -0.0370,  target:
-0.0624,      loss: 0.4069
    Validation string,      i: 1;  prediction: -0.0358,  target:
-0.0652,      loss: 0.4507
    Validation string,      i: 2;  prediction: -0.0086,  target:
-0.0381,      loss: 0.7748
Epoch [25/50], Loss: 0.3501, Loss validation: 0.4055, Time remaining: ~0.0h
49.0m 24s
    Validation string,      i: 0;  prediction: -0.0977,  target:
-0.0624,      loss: 0.5647
    Validation string,      i: 1;  prediction: -0.0779,  target:
-0.0652,      loss: 0.1953
    Validation string,      i: 2;  prediction: -0.0890,  target:
-0.0381,      loss: 1.3378
Epoch [26/50], Loss: 0.3257, Loss validation: 0.3785, Time remaining: ~0.0h
47.0m 26s
    Validation string,      i: 0;  prediction: -0.0714,  target:
-0.0624,      loss: 0.1438
    Validation string,      i: 1;  prediction: -0.0509,  target:
-0.0652,      loss: 0.2189
    Validation string,      i: 2;  prediction: -0.0231,  target:
-0.0381,      loss: 0.3940
Epoch [27/50], Loss: 0.3408, Loss validation: 0.3341, Time remaining: ~0.0h

```

```

45.0m 29s
    Validation string,      i: 0;  prediction: -0.0411,  target:
-0.0624,      loss: 0.3417
    Validation string,      i: 1;  prediction: -0.0223,  target:
-0.0652,      loss: 0.6583
    Validation string,      i: 2;  prediction: -0.0370,  target:
-0.0381,      loss: 0.0278
Epoch [28/50], Loss: 0.3194, Loss validation: 0.2853, Time remaining: ~0.0h
43.0m 30s
    Validation string,      i: 0;  prediction: -0.0561,  target:
-0.0624,      loss: 0.1017
    Validation string,      i: 1;  prediction: -0.0310,  target:
-0.0652,      loss: 0.5247
    Validation string,      i: 2;  prediction: -0.0529,  target:
-0.0381,      loss: 0.3886
Epoch [29/50], Loss: 0.3219, Loss validation: 0.2895, Time remaining: ~0.0h
41.0m 33s
    Validation string,      i: 0;  prediction: -0.0904,  target:
-0.0624,      loss: 0.4488
    Validation string,      i: 1;  prediction: -0.0867,  target:
-0.0652,      loss: 0.3298
    Validation string,      i: 2;  prediction: -0.0835,  target:
-0.0381,      loss: 1.1937
Epoch [30/50], Loss: 0.3297, Loss validation: 0.3282, Time remaining: ~0.0h
39.0m 35s
    Validation string,      i: 0;  prediction: -0.0395,  target:
-0.0624,      loss: 0.3670
    Validation string,      i: 1;  prediction: -0.0349,  target:
-0.0652,      loss: 0.4644
    Validation string,      i: 2;  prediction: 0.0366,  target:
-0.0381,      loss: 1.9602
Epoch [31/50], Loss: 0.3224, Loss validation: 0.3965, Time remaining: ~0.0h
37.0m 36s
    Validation string,      i: 0;  prediction: -0.0613,  target:
-0.0624,      loss: 0.0187
    Validation string,      i: 1;  prediction: -0.0398,  target:
-0.0652,      loss: 0.3892
    Validation string,      i: 2;  prediction: -0.0863,  target:
-0.0381,      loss: 1.2658
Epoch [32/50], Loss: 0.3333, Loss validation: 0.4152, Time remaining: ~0.0h
35.0m 38s
    Validation string,      i: 0;  prediction: -0.0191,  target:
-0.0624,      loss: 0.6939
    Validation string,      i: 1;  prediction: -0.0281,  target:
-0.0652,      loss: 0.5687
    Validation string,      i: 2;  prediction: 0.0140,  target:
-0.0381,      loss: 1.3669
Epoch [33/50], Loss: 0.3239, Loss validation: 0.4724, Time remaining: ~0.0h

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33.0m 40s
    Validation string,      i: 0;  prediction: -0.0735,  target:
-0.0624,      loss: 0.1770
    Validation string,      i: 1;  prediction: -0.0812,  target:
-0.0652,      loss: 0.2461
    Validation string,      i: 2;  prediction: -0.0813,  target:
-0.0381,      loss: 1.1350
Epoch [34/50], Loss: 0.3296, Loss validation: 0.3746, Time remaining: ~0.0h
31.0m 41s
    Validation string,      i: 0;  prediction: -0.0824,  target:
-0.0624,      loss: 0.3204
    Validation string,      i: 1;  prediction: -0.0369,  target:
-0.0652,      loss: 0.4335
    Validation string,      i: 2;  prediction: -0.0388,  target:
-0.0381,      loss: 0.0200
Epoch [35/50], Loss: 0.3172, Loss validation: 0.3560, Time remaining: ~0.0h
29.0m 43s
    Validation string,      i: 0;  prediction: 0.0397,   target:
-0.0624,      loss: 1.6360
    Validation string,      i: 1;  prediction: 0.0001,   target:
-0.0652,      loss: 1.0012
    Validation string,      i: 2;  prediction: 0.0145,   target:
-0.0381,      loss: 1.3809
Epoch [36/50], Loss: 0.3331, Loss validation: 0.5548, Time remaining: ~0.0h
27.0m 44s
    Validation string,      i: 0;  prediction: -0.0890,  target:
-0.0624,      loss: 0.4249
    Validation string,      i: 1;  prediction: -0.0733,  target:
-0.0652,      loss: 0.1245
    Validation string,      i: 2;  prediction: -0.0282,  target:
-0.0381,      loss: 0.2599
Epoch [37/50], Loss: 0.3240, Loss validation: 0.3188, Time remaining: ~0.0h
25.0m 46s
    Validation string,      i: 0;  prediction: -0.0073,  target:
-0.0624,      loss: 0.8826
    Validation string,      i: 1;  prediction: -0.0581,  target:
-0.0652,      loss: 0.1090
    Validation string,      i: 2;  prediction: -0.0547,  target:
-0.0381,      loss: 0.4353
Epoch [38/50], Loss: 0.3234, Loss validation: 0.2882, Time remaining: ~0.0h
23.0m 47s
    Validation string,      i: 0;  prediction: 0.0031,   target:
-0.0624,      loss: 1.0498
    Validation string,      i: 1;  prediction: -0.0574,  target:
-0.0652,      loss: 0.1195
    Validation string,      i: 2;  prediction: -0.0603,  target:
-0.0381,      loss: 0.5839
Epoch [39/50], Loss: 0.3256, Loss validation: 0.3354, Time remaining: ~0.0h

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21.0m 49s
    Validation string,      i: 0;  prediction: -0.0553,  target:
-0.0624,      loss: 0.1143
    Validation string,      i: 1;  prediction: -0.0527,  target:
-0.0652,      loss: 0.1917
    Validation string,      i: 2;  prediction: -0.0555,  target:
-0.0381,      loss: 0.4575
Epoch [40/50], Loss: 0.3357, Loss validation: 0.4054, Time remaining: ~0.0h
19.0m 50s
    Validation string,      i: 0;  prediction: -0.0614,  target:
-0.0624,      loss: 0.0163
    Validation string,      i: 1;  prediction: -0.0248,  target:
-0.0652,      loss: 0.6199
    Validation string,      i: 2;  prediction: -0.0688,  target:
-0.0381,      loss: 0.8081
Epoch [41/50], Loss: 0.3308, Loss validation: 0.3526, Time remaining: ~0.0h
17.0m 52s
    Validation string,      i: 0;  prediction: -0.0707,  target:
-0.0624,      loss: 0.1319
    Validation string,      i: 1;  prediction: -0.0421,  target:
-0.0652,      loss: 0.3542
    Validation string,      i: 2;  prediction: -0.0436,  target:
-0.0381,      loss: 0.1462
Epoch [42/50], Loss: 0.3286, Loss validation: 0.2835, Time remaining: ~0.0h
15.0m 53s
    Validation string,      i: 0;  prediction: -0.0282,  target:
-0.0624,      loss: 0.5479
    Validation string,      i: 1;  prediction: -0.0153,  target:
-0.0652,      loss: 0.7647
    Validation string,      i: 2;  prediction: -0.0488,  target:
-0.0381,      loss: 0.2822
Epoch [43/50], Loss: 0.3276, Loss validation: 0.3723, Time remaining: ~0.0h
13.0m 54s
    Validation string,      i: 0;  prediction: -0.0574,  target:
-0.0624,      loss: 0.0808
    Validation string,      i: 1;  prediction: -0.0423,  target:
-0.0652,      loss: 0.3513
    Validation string,      i: 2;  prediction: -0.0395,  target:
-0.0381,      loss: 0.0373
Epoch [44/50], Loss: 0.3241, Loss validation: 0.3782, Time remaining: ~0.0h
11.0m 55s
    Validation string,      i: 0;  prediction: -0.0873,  target:
-0.0624,      loss: 0.3984
    Validation string,      i: 1;  prediction: -0.0635,  target:
-0.0652,      loss: 0.0252
    Validation string,      i: 2;  prediction: -0.0701,  target:
-0.0381,      loss: 0.8407
Epoch [45/50], Loss: 0.3359, Loss validation: 0.3525, Time remaining: ~0.0h 9.0m

```

```

56s
    Validation string,      i: 0;  prediction: -0.0834,  target:
-0.0624,      loss: 0.3353
    Validation string,      i: 1;  prediction: -0.0642,  target:
-0.0652,      loss: 0.0146
    Validation string,      i: 2;  prediction: -0.0644,  target:
-0.0381,      loss: 0.6919
Epoch [46/50], Loss: 0.3287, Loss validation: 0.3274, Time remaining: ~0.0h 7.0m
56s
    Validation string,      i: 0;  prediction: -0.0083,  target:
-0.0624,      loss: 0.8664
    Validation string,      i: 1;  prediction: -0.0231,  target:
-0.0652,      loss: 0.6459
    Validation string,      i: 2;  prediction: -0.0341,  target:
-0.0381,      loss: 0.1039
Epoch [47/50], Loss: 0.3226, Loss validation: 0.4333, Time remaining: ~0.0h 5.0m
57s
    Validation string,      i: 0;  prediction: -0.0188,  target:
-0.0624,      loss: 0.6990
    Validation string,      i: 1;  prediction: -0.0475,  target:
-0.0652,      loss: 0.2709
    Validation string,      i: 2;  prediction: -0.0647,  target:
-0.0381,      loss: 0.6991
Epoch [48/50], Loss: 0.3285, Loss validation: 0.3393, Time remaining: ~0.0h 3.0m
58s
    Validation string,      i: 0;  prediction: -0.0715,  target:
-0.0624,      loss: 0.1454
    Validation string,      i: 1;  prediction: -0.0933,  target:
-0.0652,      loss: 0.4319
    Validation string,      i: 2;  prediction: -0.0774,  target:
-0.0381,      loss: 1.0331
Epoch [49/50], Loss: 0.3215, Loss validation: 0.3446, Time remaining: ~0.0h 1.0m
59s
    Validation string,      i: 0;  prediction: -0.0537,  target:
-0.0624,      loss: 0.1399
    Validation string,      i: 1;  prediction: -0.0639,  target:
-0.0652,      loss: 0.0193
    Validation string,      i: 2;  prediction: -0.0167,  target:
-0.0381,      loss: 0.5605
Epoch [50/50], Loss: 0.3215, Loss validation: 0.3246, Time remaining: ~0.0h 0.0m
0s

```

```

[ ]: # save string of the model
model.save_str(
    metadata={
        "data_file_path": data_file_path,
    }
)

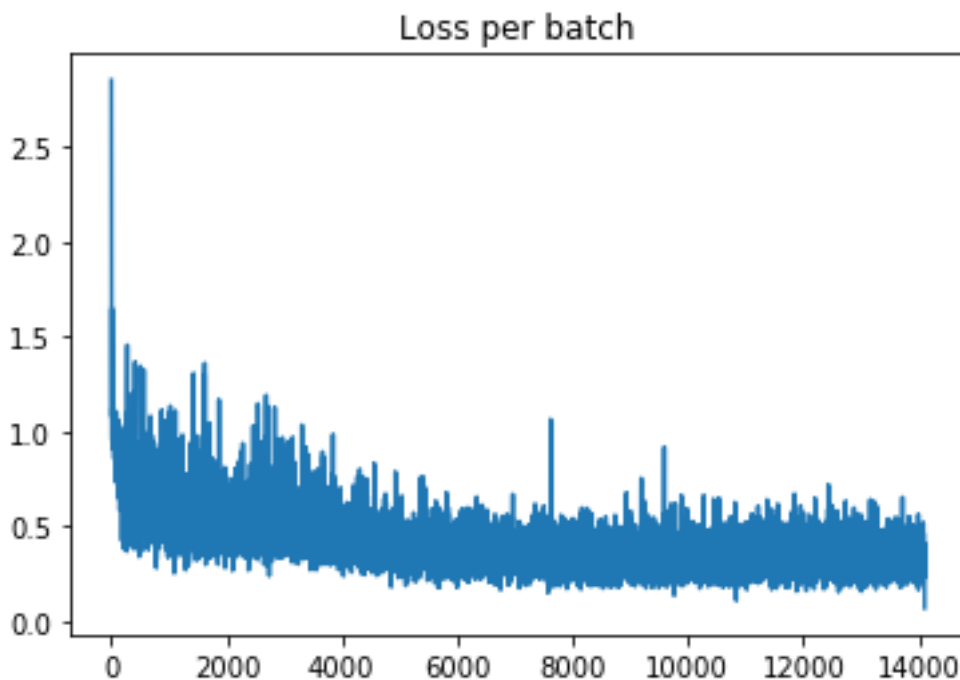
```

```
)
```

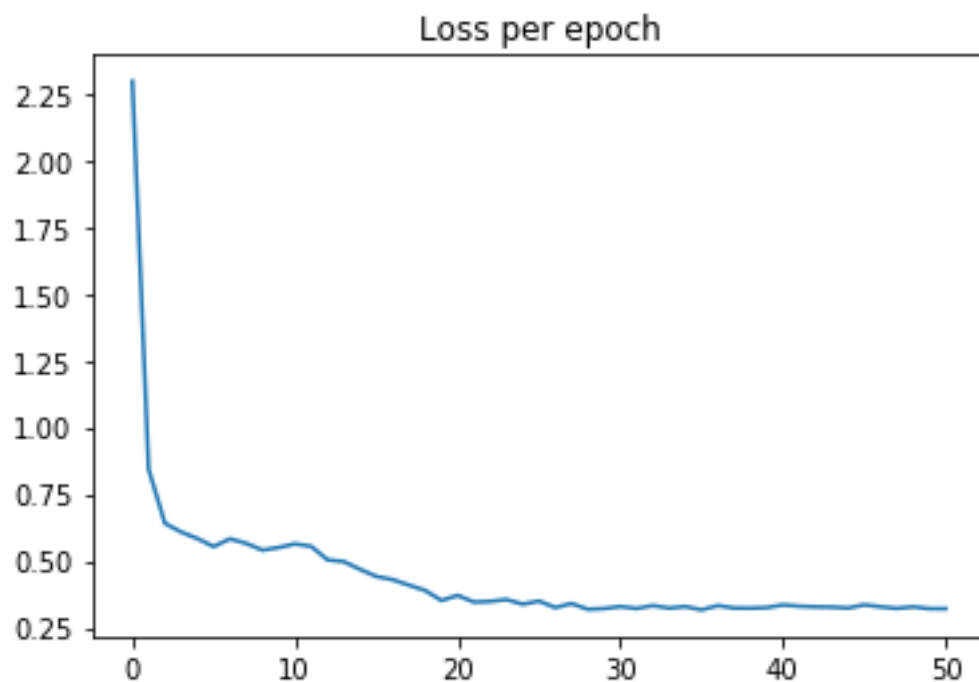
Saved in: peptide-QML/checkpoints/0809/txts/0809-sh\_em\_1qm\_v2\_model\_str\_1.txt

```
[ ]: # plot the losses of the trainig loop and save the figures  
model.plot_losses(save=True)
```

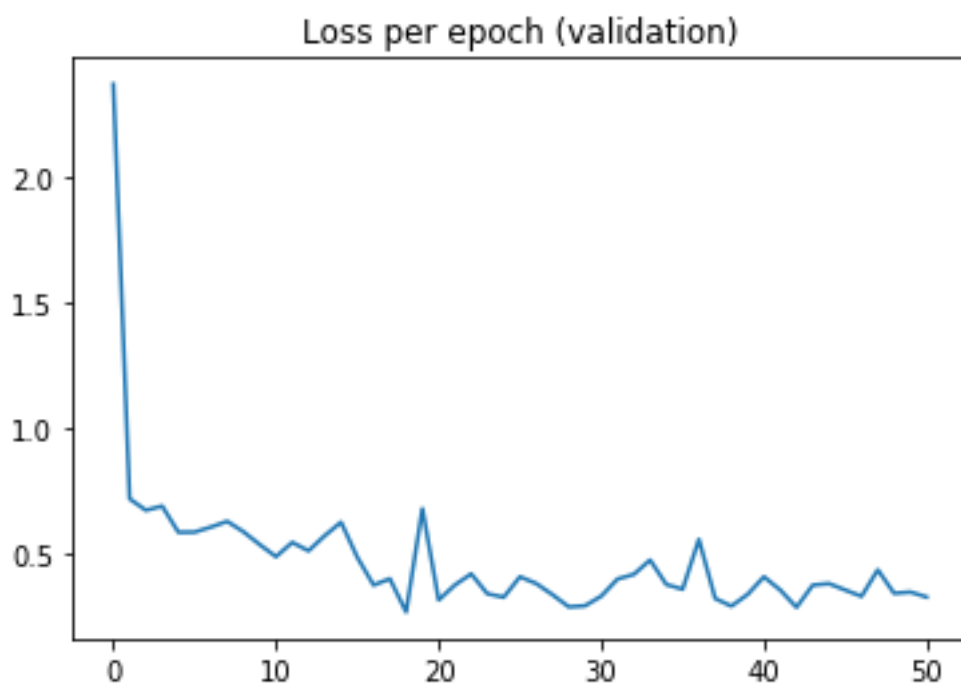
Saved in: peptide-  
QML/checkpoints/0809/plots/0809-sh\_em\_1qm\_v2\_losses\_batches\_1.png



Saved in: peptide-  
QML/checkpoints/0809/plots/0809-sh\_em\_1qm\_v2\_losses\_epoch\_1.png



Saved in: peptide-  
QML/checkpoints/0809/plots/0809-sh\_em\_1qm\_v2\_losses\_epoch\_validation\_1.png

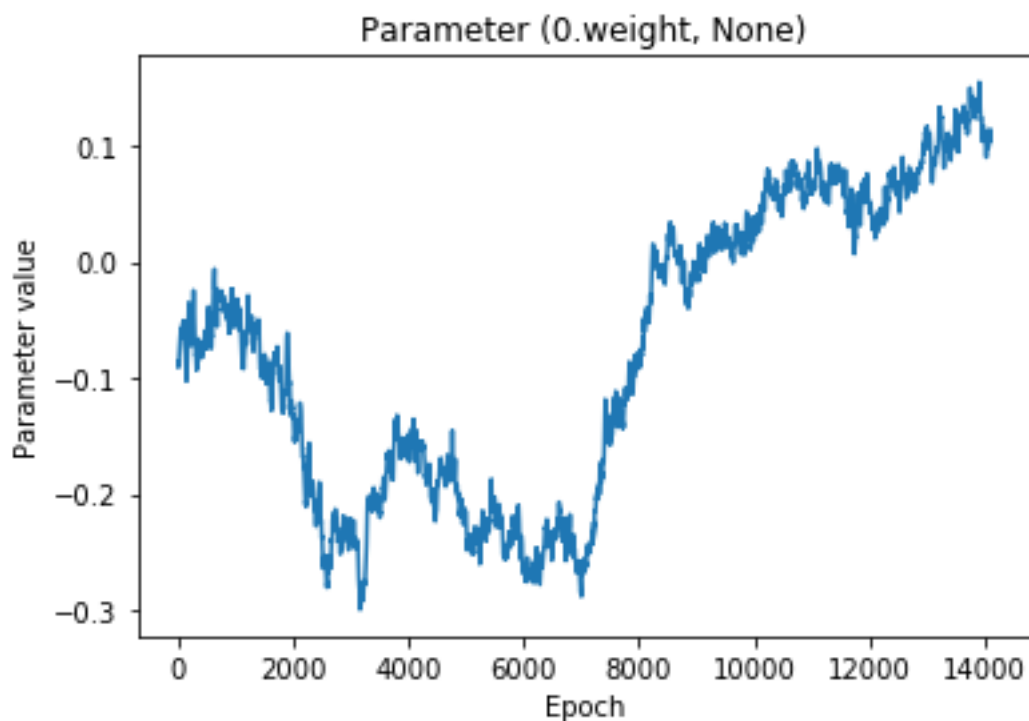




```
[ ]: # plot how the average of the parameters in each layer changes over time, and
      ↪ save that
for layer in model.model.state_dict().keys():
    model.plot_parameter(layer=layer, save=True)
```

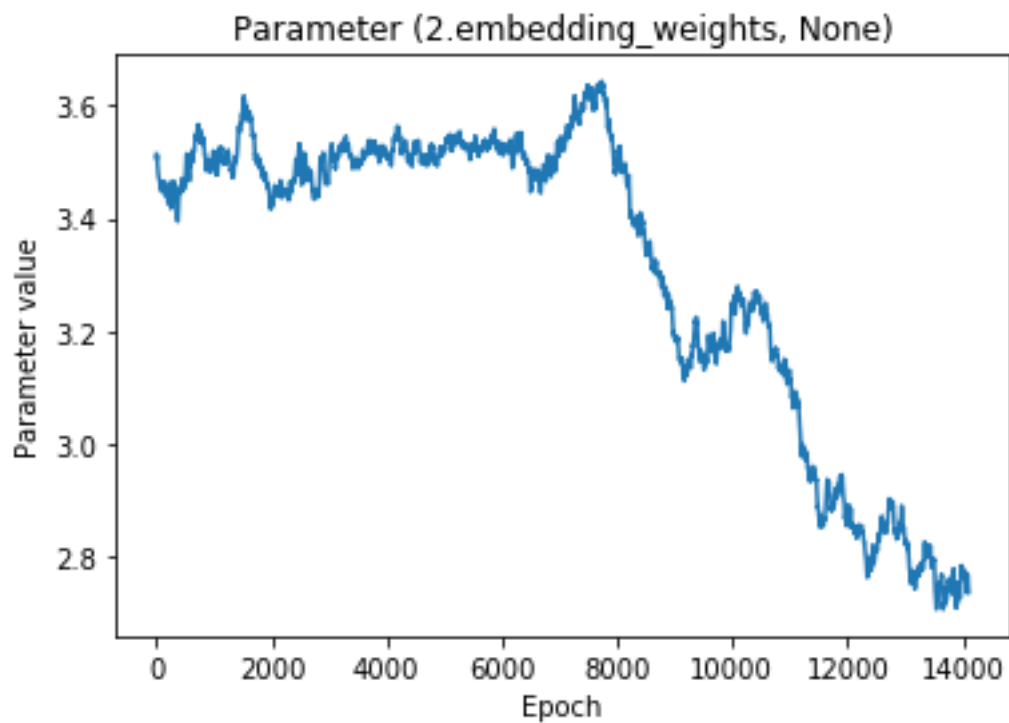
Saved in: peptide-

QML/checkpoints/0809/plots/0809-sh\_em\_1qm\_v2\_parameter\_0.weight\_None\_1.png

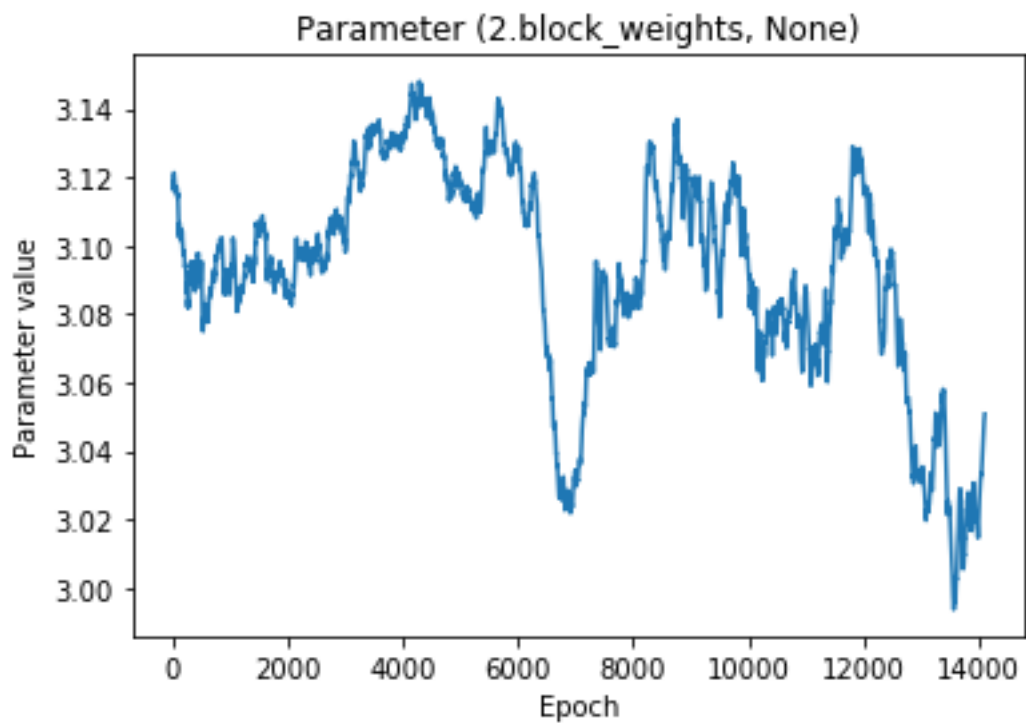


Saved in: peptide-QML/checkpoints/0809/plots/0809-

sh\_em\_1qm\_v2\_parameter\_2.embedding\_weights\_None\_1.png

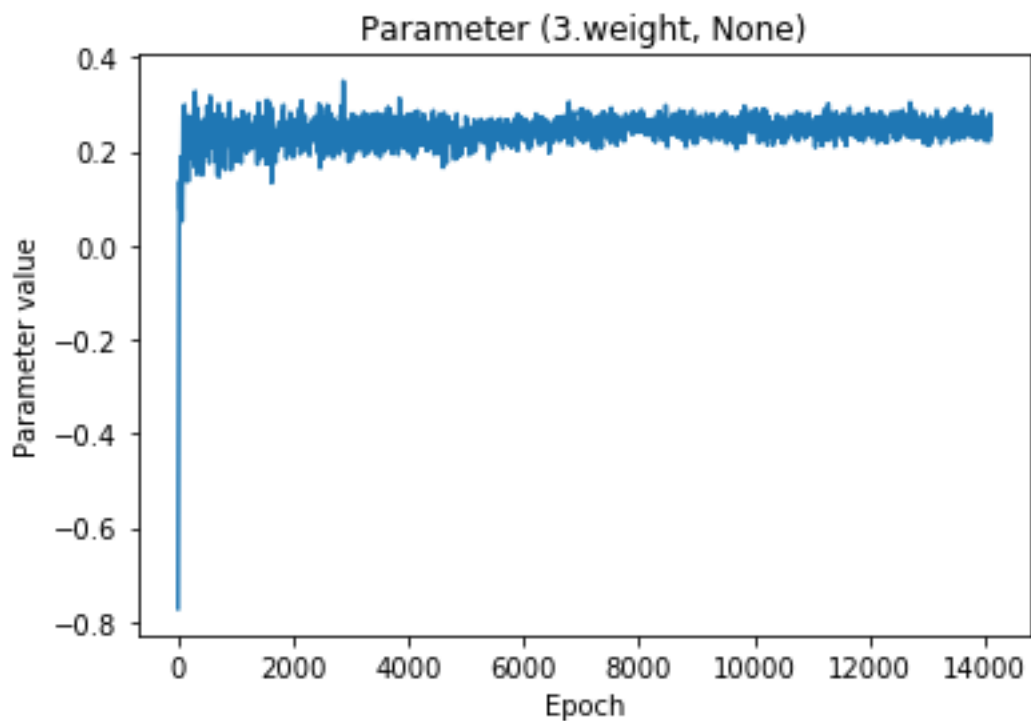


Saved in: peptide-QML/checkpoints/0809/plots/0809-sh\_em\_1qm\_v2\_parameter\_2.block\_weights\_None\_1.png



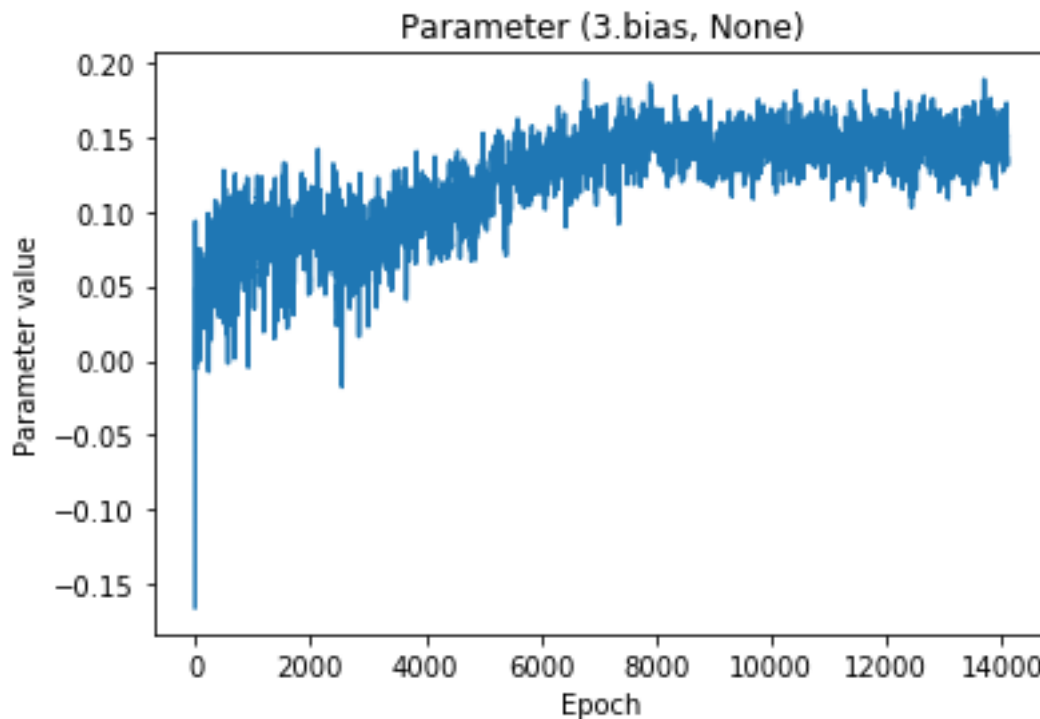
Saved in: peptide-

QML/checkpoints/0809/plots/0809-sh\_em\_1qm\_v2\_parameter\_3.weight\_None\_1.png



Saved in: peptide-

QML/checkpoints/0809/plots/0809-sh\_em\_1qm\_v2\_parameter\_3.bias\_None\_1.png



```
[ ]: # model.plot_parameter(layer='7.weights', index=50)
```

```
[ ]: #save all the parameters of the model and the intermediate parameters of the
      ↪model
      model.save_state_dict(intermediate=False)
```

Model saved as peptide-QML/checkpoints/0809/models/0809-sh\_em\_1qm\_v2\_1.pth

```
[ ]: # print validation and save it
      model.print_validation(save=True, precision=4, percentatge=1)
```

i: 0,	target: -0.0624,	output: -0.0537,	loss: 0.1399
i: 1,	target: -0.0732,	output: -0.0452,	loss: 0.3820
i: 2,	target: -0.0957,	output: -0.0553,	loss: 0.4224
i: 3,	target: -0.0556,	output: -0.0102,	loss: 0.8162
i: 4,	target: 0.2263,	output: 0.2630,	loss: 0.1623
i: 5,	target: -0.0607,	output: -0.0632,	loss: 0.0412
i: 6,	target: -0.0550,	output: -0.0646,	loss: 0.1748
i: 7,	target: -0.0752,	output: -0.0716,	loss: 0.0478
i: 8,	target: -0.0383,	output: -0.0528,	loss: 0.3791
i: 9,	target: 0.1330,	output: 0.0053,	loss: 0.9603
i: 10,	target: -0.0652,	output: -0.0639,	loss: 0.0193
i: 11,	target: -0.0324,	output: -0.0524,	loss: 0.6203
i: 12,	target: -0.0550,	output: -0.0672,	loss: 0.2227

i: 13,	target: 0.2137,	output: 0.1769,	loss: 0.1720
i: 14,	target: -0.0659,	output: -0.0708,	loss: 0.0747
i: 15,	target: -0.0560,	output: -0.0679,	loss: 0.2112
i: 16,	target: -0.0673,	output: -0.0776,	loss: 0.1534
i: 17,	target: -0.0165,	output: 0.0742,	loss: 5.4975
i: 18,	target: -0.0692,	output: -0.0658,	loss: 0.0484
i: 19,	target: 0.2680,	output: 0.2635,	loss: 0.0166
i: 20,	target: -0.0381,	output: -0.0167,	loss: 0.5605
i: 21,	target: -0.0875,	output: -0.0729,	loss: 0.1664
i: 22,	target: -0.0720,	output: -0.0262,	loss: 0.6357
i: 23,	target: 0.1397,	output: 0.0681,	loss: 0.5124
i: 24,	target: 0.1908,	output: 0.1448,	loss: 0.2410
i: 25,	target: 0.0914,	output: 0.0565,	loss: 0.3813
i: 26,	target: 0.0066,	output: 0.0262,	loss: 2.9897
i: 27,	target: -0.0533,	output: -0.0711,	loss: 0.3348
i: 28,	target: 0.1908,	output: 0.1502,	loss: 0.2129
i: 29,	target: -0.0752,	output: -0.0618,	loss: 0.1783
i: 30,	target: -0.0622,	output: -0.0635,	loss: 0.0208
i: 31,	target: 0.1299,	output: 0.0288,	loss: 0.7785
i: 32,	target: 0.0297,	output: 0.0160,	loss: 0.4603
i: 33,	target: -0.0439,	output: -0.0484,	loss: 0.1016
i: 34,	target: -0.0424,	output: -0.0625,	loss: 0.4741
i: 35,	target: -0.0404,	output: -0.0344,	loss: 0.1488
i: 36,	target: -0.0543,	output: -0.0281,	loss: 0.4823
i: 37,	target: 0.1771,	output: 0.1694,	loss: 0.0432
i: 38,	target: -0.0621,	output: -0.0537,	loss: 0.1355
i: 39,	target: -0.0741,	output: -0.0582,	loss: 0.2148
i: 40,	target: -0.0781,	output: -0.0635,	loss: 0.1868
i: 41,	target: -0.0177,	output: 0.0165,	loss: 1.9302
i: 42,	target: -0.0968,	output: -0.0649,	loss: 0.3292
i: 43,	target: 0.1956,	output: 0.1728,	loss: 0.1168
i: 44,	target: 0.2398,	output: 0.2497,	loss: 0.0411
i: 45,	target: 0.0086,	output: 0.0296,	loss: 2.4511
i: 46,	target: -0.0795,	output: -0.0601,	loss: 0.2445
i: 47,	target: 0.1120,	output: 0.0661,	loss: 0.4094
i: 48,	target: -0.0438,	output: -0.0566,	loss: 0.2919
i: 49,	target: -0.0876,	output: -0.0416,	loss: 0.5248
i: 50,	target: 0.1028,	output: 0.0953,	loss: 0.0736
i: 51,	target: 0.1929,	output: 0.2189,	loss: 0.1345
i: 52,	target: -0.0805,	output: -0.0707,	loss: 0.1216
i: 53,	target: -0.0852,	output: -0.0551,	loss: 0.3537
i: 54,	target: -0.0366,	output: -0.0589,	loss: 0.6064
i: 55,	target: -0.0432,	output: -0.0649,	loss: 0.5033
i: 56,	target: -0.0647,	output: -0.0714,	loss: 0.1041
i: 57,	target: 0.2474,	output: 0.2344,	loss: 0.0524
i: 58,	target: -0.0712,	output: -0.0134,	loss: 0.8116
i: 59,	target: -0.0567,	output: -0.0582,	loss: 0.0263
i: 60,	target: -0.0700,	output: -0.0696,	loss: 0.0050

i: 61,	target: -0.0614,	output: -0.0526,	loss: 0.1437
i: 62,	target: 0.0299,	output: 0.0300,	loss: 0.0017
i: 63,	target: 0.0260,	output: 0.0179,	loss: 0.3115
i: 64,	target: 0.1498,	output: 0.0821,	loss: 0.4521
i: 65,	target: -0.0825,	output: -0.0481,	loss: 0.4174
i: 66,	target: 0.0650,	output: 0.0907,	loss: 0.3948
i: 67,	target: 0.1810,	output: 0.1726,	loss: 0.0462
i: 68,	target: -0.0764,	output: -0.0551,	loss: 0.2794
i: 69,	target: -0.0794,	output: -0.0436,	loss: 0.4502
i: 70,	target: 0.0241,	output: 0.0234,	loss: 0.0309
i: 71,	target: -0.0318,	output: -0.0678,	loss: 1.1291
i: 72,	target: -0.0828,	output: -0.0646,	loss: 0.2199
i: 73,	target: 0.1970,	output: 0.2019,	loss: 0.0247
i: 74,	target: -0.0810,	output: -0.0694,	loss: 0.1439
i: 75,	target: -0.0666,	output: -0.0670,	loss: 0.0055
i: 76,	target: -0.0699,	output: -0.0576,	loss: 0.1763
i: 77,	target: -0.0671,	output: -0.0644,	loss: 0.0398
i: 78,	target: -0.0698,	output: -0.0224,	loss: 0.6787
i: 79,	target: -0.0908,	output: -0.0540,	loss: 0.4055
i: 80,	target: 0.0055,	output: 0.0435,	loss: 6.8305
i: 81,	target: 0.1705,	output: 0.2007,	loss: 0.1772
i: 82,	target: 0.0982,	output: 0.0812,	loss: 0.1735
i: 83,	target: -0.0656,	output: -0.0303,	loss: 0.5384
i: 84,	target: 0.0702,	output: 0.0546,	loss: 0.2222
i: 85,	target: 0.1545,	output: 0.0909,	loss: 0.4115
i: 86,	target: 0.1919,	output: 0.1279,	loss: 0.3332
i: 87,	target: 0.1150,	output: 0.1141,	loss: 0.0078
i: 88,	target: -0.0542,	output: 0.0162,	loss: 1.2997
i: 89,	target: -0.1007,	output: -0.0593,	loss: 0.4105
i: 90,	target: -0.0437,	output: -0.0637,	loss: 0.4577
i: 91,	target: -0.0470,	output: -0.0568,	loss: 0.2084
i: 92,	target: 0.1001,	output: 0.0544,	loss: 0.4567
i: 93,	target: -0.0611,	output: -0.0186,	loss: 0.6953
i: 94,	target: 0.1970,	output: 0.1130,	loss: 0.4262
i: 95,	target: -0.0804,	output: -0.0541,	loss: 0.3268
i: 96,	target: -0.0513,	output: 0.0264,	loss: 1.5152
i: 97,	target: -0.0189,	output: 0.0274,	loss: 2.4493
i: 98,	target: -0.0433,	output: -0.0334,	loss: 0.2272
i: 99,	target: 0.1094,	output: 0.0823,	loss: 0.2476
i: 100,	target: 0.1410,	output: 0.1454,	loss:
0.0311			
i: 101,	target: 0.1832,	output: 0.1586,	loss:
0.1346			
i: 102,	target: 0.1531,	output: 0.1138,	loss:
0.2568			
i: 103,	target: -0.0533,	output: -0.0701,	loss:
0.3152			
i: 104,	target: -0.0924,	output: -0.0688,	loss:

0.2551			
i: 105,	target: -0.0505,	output: -0.0789,	loss:
0.5615			
i: 106,	target: -0.0767,	output: -0.0496,	loss:
0.3531			
i: 107,	target: 0.0237,	output: 0.0796,	loss:
2.3571			
i: 108,	target: -0.0104,	output: -0.0316,	loss:
2.0339			
i: 109,	target: 0.1281,	output: 0.0871,	loss:
0.3196			
i: 110,	target: 0.1360,	output: 0.0643,	loss:
0.5270			
i: 111,	target: 0.1811,	output: 0.1293,	loss:
0.2860			
i: 112,	target: 0.0319,	output: 0.0519,	loss:
0.6286			
i: 113,	target: -0.0775,	output: -0.0472,	loss:
0.3904			
i: 114,	target: 0.0160,	output: 0.0074,	loss:
0.5353			
i: 115,	target: 0.1890,	output: 0.1379,	loss:
0.2703			
i: 116,	target: -0.1065,	output: -0.0467,	loss:
0.5618			
i: 117,	target: 0.1178,	output: 0.1371,	loss:
0.1634			
i: 118,	target: 0.1393,	output: 0.1608,	loss:
0.1547			
i: 119,	target: 0.3057,	output: 0.2378,	loss:
0.2221			
i: 120,	target: 0.1541,	output: 0.1105,	loss:
0.2825			
i: 121,	target: -0.0708,	output: -0.0451,	loss:
0.3631			
i: 122,	target: 0.0944,	output: 0.0608,	loss:
0.3559			
i: 123,	target: 0.2542,	output: 0.1420,	loss:
0.4415			
i: 124,	target: -0.0559,	output: -0.0717,	loss:
0.2828			
i: 125,	target: -0.0730,	output: -0.0279,	loss:
0.6173			
i: 126,	target: -0.0553,	output: -0.0560,	loss:
0.0135			
i: 127,	target: -0.0343,	output: -0.0725,	loss:
1.1121			
i: 128,	target: -0.0321,	output: -0.0717,	loss:

1.2358			
i: 129,	target: 0.1773,	output: 0.2083,	loss:
0.1746			
i: 130,	target: -0.0804,	output: -0.0614,	loss:
0.2362			
i: 131,	target: -0.0530,	output: -0.0750,	loss:
0.4155			
i: 132,	target: -0.0937,	output: -0.0503,	loss:
0.4630			
i: 133,	target: 0.2282,	output: 0.2044,	loss:
0.1045			
i: 134,	target: -0.0741,	output: -0.0668,	loss:
0.0982			
i: 135,	target: 0.1810,	output: 0.1329,	loss:
0.2659			
i: 136,	target: 0.0218,	output: 0.0538,	loss:
1.4697			
i: 137,	target: -0.0304,	output: 0.0026,	loss:
1.0853			
i: 138,	target: 0.3108,	output: 0.3053,	loss:
0.0178			
i: 139,	target: 0.0906,	output: 0.0820,	loss:
0.0940			
i: 140,	target: -0.0457,	output: -0.0566,	loss:
0.2401			
i: 141,	target: -0.0549,	output: -0.0172,	loss:
0.6863			
i: 142,	target: 0.0504,	output: -0.0002,	loss:
1.0035			
i: 143,	target: -0.0536,	output: -0.0553,	loss:
0.0318			
i: 144,	target: -0.0685,	output: -0.0640,	loss:
0.0662			
i: 145,	target: -0.0627,	output: -0.0645,	loss:
0.0287			
i: 146,	target: -0.0750,	output: -0.0722,	loss:
0.0371			
i: 147,	target: 0.2131,	output: 0.2003,	loss:
0.0599			
i: 148,	target: -0.0848,	output: -0.0704,	loss:
0.1693			
i: 149,	target: -0.0285,	output: 0.0005,	loss:
1.0192			
i: 150,	target: 0.0083,	output: 0.0279,	loss:
2.3713			
i: 151,	target: -0.0721,	output: -0.0614,	loss:
0.1484			
i: 152,	target: -0.0601,	output: -0.0311,	loss:



0.4826			
i: 153,	target: -0.0788,	output: -0.0489,	loss:
0.3796			
i: 154,	target: -0.0709,	output: -0.0641,	loss:
0.0962			
i: 155,	target: -0.0860,	output: -0.0834,	loss:
0.0305			
i: 156,	target: -0.1010,	output: -0.0658,	loss:
0.3488			
i: 157,	target: 0.0245,	output: 0.0593,	loss:
1.4261			
i: 158,	target: 0.1889,	output: -0.0827,	loss:
1.4376			
i: 159,	target: 0.2430,	output: 0.2441,	loss:
0.0044			
i: 160,	target: -0.0369,	output: -0.0674,	loss:
0.8262			
i: 161,	target: -0.0694,	output: -0.0590,	loss:
0.1503			
i: 162,	target: -0.0751,	output: -0.0621,	loss:
0.1728			
i: 163,	target: -0.0635,	output: -0.0598,	loss:
0.0590			
i: 164,	target: -0.0816,	output: -0.0757,	loss:
0.0724			
i: 165,	target: 0.1690,	output: 0.1162,	loss:
0.3120			
i: 166,	target: -0.0659,	output: -0.0661,	loss:
0.0034			
i: 167,	target: 0.1296,	output: 0.1024,	loss:
0.2100			
i: 168,	target: -0.0528,	output: -0.0171,	loss:
0.6757			
i: 169,	target: -0.0888,	output: -0.0241,	loss:
0.7287			
i: 170,	target: 0.1004,	output: 0.1432,	loss:
0.4264			
i: 171,	target: 0.1537,	output: 0.1208,	loss:
0.2142			
i: 172,	target: -0.0686,	output: -0.0705,	loss:
0.0277			
i: 173,	target: -0.0632,	output: -0.0409,	loss:
0.3536			
i: 174,	target: -0.0833,	output: -0.0644,	loss:
0.2273			
i: 175,	target: 0.1424,	output: 0.0934,	loss:
0.3439			
i: 176,	target: 0.0484,	output: 0.0948,	loss:

0.9596			
i: 177,	target: 0.2275,	output: 0.2177,	loss:
0.0431			
i: 178,	target: -0.0723,	output: -0.0465,	loss:
0.3568			
i: 179,	target: -0.0779,	output: -0.0472,	loss:
0.3941			
i: 180,	target: 0.1076,	output: 0.0543,	loss:
0.4948			
i: 181,	target: 0.0360,	output: -0.0049,	loss:
1.1370			
i: 182,	target: -0.0699,	output: -0.0493,	loss:
0.2953			
i: 183,	target: 0.2248,	output: 0.1562,	loss:
0.3052			
i: 184,	target: 0.1866,	output: -0.0698,	loss:
1.3738			
i: 185,	target: 0.2060,	output: 0.2233,	loss:
0.0844			
i: 186,	target: -0.0393,	output: -0.0227,	loss:
0.4229			
i: 187,	target: -0.0707,	output: -0.0477,	loss:
0.3256			
i: 188,	target: 0.1811,	output: 0.1326,	loss:
0.2679			
i: 189,	target: -0.0800,	output: -0.0579,	loss:
0.2766			
i: 190,	target: 0.1059,	output: 0.0896,	loss:
0.1541			
i: 191,	target: 0.0659,	output: 0.0753,	loss:
0.1426			
i: 192,	target: -0.0848,	output: -0.0155,	loss:
0.8172			
i: 193,	target: 0.0282,	output: 0.0350,	loss:
0.2418			
i: 194,	target: -0.0554,	output: -0.0659,	loss:
0.1895			
i: 195,	target: 0.2320,	output: 0.1536,	loss:
0.3377			
i: 196,	target: -0.0152,	output: -0.0751,	loss:
3.9303			
i: 197,	target: 0.1143,	output: 0.0140,	loss:
0.8779			
i: 198,	target: 0.1658,	output: 0.0923,	loss:
0.4435			
i: 199,	target: -0.0690,	output: -0.0646,	loss:
0.0631			
i: 200,	target: 0.2148,	output: 0.1965,	loss:

0.0854			
i: 201,	target: -0.0902,	output: -0.0614,	loss:
0.3188			
i: 202,	target: -0.0936,	output: -0.0389,	loss:
0.5846			
i: 203,	target: 0.0754,	output: 0.0985,	loss:
0.3061			
i: 204,	target: -0.0759,	output: -0.0530,	loss:
0.3013			
i: 205,	target: 0.2029,	output: 0.1902,	loss:
0.0627			
i: 206,	target: -0.0626,	output: -0.0367,	loss:
0.4139			
i: 207,	target: -0.0860,	output: -0.0450,	loss:
0.4763			
i: 208,	target: -0.0433,	output: -0.0726,	loss:
0.6778			
i: 209,	target: 0.0019,	output: -0.0587,	loss:
32.5685			
i: 210,	target: 0.1867,	output: 0.2317,	loss:
0.2409			
i: 211,	target: 0.1755,	output: 0.1186,	loss:
0.3243			
i: 212,	target: -0.0906,	output: -0.0702,	loss:
0.2257			
i: 213,	target: 0.3761,	output: 0.1015,	loss:
0.7302			
i: 214,	target: 0.0285,	output: 0.0501,	loss:
0.7553			
i: 215,	target: -0.0002,	output: 0.0466,	loss:
285.1146			
i: 216,	target: 0.1923,	output: 0.1562,	loss:
0.1876			
i: 217,	target: -0.0790,	output: -0.0837,	loss:
0.0590			
i: 218,	target: -0.0747,	output: -0.0721,	loss:
0.0344			
i: 219,	target: -0.0649,	output: -0.0600,	loss:
0.0757			
i: 220,	target: -0.0814,	output: -0.0215,	loss:
0.7354			
i: 221,	target: -0.0755,	output: -0.0422,	loss:
0.4413			
i: 222,	target: 0.0957,	output: 0.0446,	loss:
0.5335			
i: 223,	target: 0.0333,	output: 0.0163,	loss:
0.5094			
i: 224,	target: 0.1131,	output: 0.0322,	loss:

0.7154			
i: 225,	target: -0.0592,	output: -0.0409,	loss:
0.3092			
i: 226,	target: 0.1323,	output: 0.1363,	loss:
0.0303			
i: 227,	target: 0.3122,	output: 0.2598,	loss:
0.1677			
i: 228,	target: 0.1963,	output: 0.1726,	loss:
0.1207			
i: 229,	target: 0.1895,	output: 0.2063,	loss:
0.0884			
i: 230,	target: -0.0560,	output: -0.0611,	loss:
0.0906			
i: 231,	target: -0.0847,	output: -0.0347,	loss:
0.5900			
i: 232,	target: -0.0888,	output: -0.0599,	loss:
0.3259			
i: 233,	target: -0.1072,	output: -0.0663,	loss:
0.3817			
i: 234,	target: 0.1549,	output: 0.1486,	loss:
0.0405			
i: 235,	target: 0.1200,	output: 0.0913,	loss:
0.2395			
i: 236,	target: -0.0767,	output: -0.0539,	loss:
0.2969			
i: 237,	target: 0.1924,	output: 0.1992,	loss:
0.0356			
i: 238,	target: -0.0463,	output: -0.0554,	loss:
0.1953			
i: 239,	target: 0.1970,	output: 0.2092,	loss:
0.0621			
i: 240,	target: -0.0696,	output: -0.0733,	loss:
0.0538			
i: 241,	target: 0.1671,	output: 0.1493,	loss:
0.1067			
i: 242,	target: -0.0728,	output: -0.0730,	loss:
0.0026			
i: 243,	target: 0.0671,	output: 0.0184,	loss:
0.7259			
i: 244,	target: 0.1820,	output: 0.1557,	loss:
0.1444			
i: 245,	target: -0.0472,	output: -0.0504,	loss:
0.0686			
i: 246,	target: 0.1430,	output: 0.0879,	loss:
0.3855			
i: 247,	target: 0.1190,	output: 0.0841,	loss:
0.2931			
i: 248,	target: -0.0719,	output: -0.0458,	loss:

0.3632			
i: 249,	target: 0.1067,	output: 0.0226,	loss:
0.7884			
i: 250,	target: -0.0883,	output: -0.0755,	loss:
0.1446			
i: 251,	target: -0.0247,	output: -0.0225,	loss:
0.0897			
i: 252,	target: 0.0358,	output: -0.0027,	loss:
1.0763			
i: 253,	target: -0.0912,	output: -0.0591,	loss:
0.3517			
i: 254,	target: -0.0864,	output: -0.0636,	loss:
0.2645			
i: 255,	target: -0.0551,	output: -0.0691,	loss:
0.2542			
i: 256,	target: -0.0449,	output: -0.0424,	loss:
0.0547			
i: 257,	target: -0.0726,	output: -0.0726,	loss:
0.0001			
i: 258,	target: -0.0657,	output: -0.0457,	loss:
0.3045			
i: 259,	target: -0.0845,	output: -0.0374,	loss:
0.5578			
i: 260,	target: 0.2236,	output: 0.1953,	loss:
0.1265			
i: 261,	target: -0.0484,	output: -0.0270,	loss:
0.4430			
i: 262,	target: 0.1198,	output: 0.1204,	loss:
0.0050			
i: 263,	target: -0.0908,	output: -0.0406,	loss:
0.5527			
i: 264,	target: 0.1947,	output: 0.1525,	loss:
0.2170			
i: 265,	target: 0.0926,	output: 0.0790,	loss:
0.1464			
i: 266,	target: 0.2222,	output: 0.1837,	loss:
0.1733			
i: 267,	target: 0.1248,	output: 0.0241,	loss:
0.8072			
i: 268,	target: -0.0606,	output: -0.0795,	loss:
0.3127			
i: 269,	target: 0.0394,	output: 0.0072,	loss:
0.8168			
i: 270,	target: -0.1018,	output: -0.0684,	loss:
0.3280			
i: 271,	target: -0.0523,	output: -0.0532,	loss:
0.0171			
i: 272,	target: -0.0937,	output: -0.0464,	loss:

0.5051			
i: 273,	target: 0.0491,	output: 0.0252,	loss:
0.4859			
i: 274,	target: -0.0710,	output: -0.0551,	loss:
0.2245			
i: 275,	target: -0.0560,	output: -0.0464,	loss:
0.1705			
i: 276,	target: 0.1281,	output: 0.0503,	loss:
0.6071			
i: 277,	target: 0.3018,	output: 0.2798,	loss:
0.0729			
i: 278,	target: -0.0458,	output: -0.0506,	loss:
0.1036			
i: 279,	target: -0.0352,	output: -0.0594,	loss:
0.6881			
i: 280,	target: -0.0943,	output: -0.0475,	loss:
0.4969			
i: 281,	target: -0.0578,	output: -0.0598,	loss:
0.0341			
i: 282,	target: -0.0748,	output: -0.0289,	loss:
0.6138			
i: 283,	target: -0.0396,	output: -0.0448,	loss:
0.1296			
i: 284,	target: 0.2358,	output: 0.1652,	loss:
0.2996			
i: 285,	target: -0.0366,	output: -0.0300,	loss:
0.1807			
i: 286,	target: -0.0600,	output: -0.0281,	loss:
0.5312			
i: 287,	target: 0.1944,	output: 0.1033,	loss:
0.4686			
i: 288,	target: -0.0764,	output: -0.0529,	loss:
0.3076			
i: 289,	target: -0.0798,	output: -0.0625,	loss:
0.2163			
i: 290,	target: 0.1139,	output: 0.0604,	loss:
0.4702			
i: 291,	target: 0.4538,	output: 0.3246,	loss:
0.2847			
i: 292,	target: 0.1674,	output: 0.0582,	loss:
0.6524			
i: 293,	target: -0.0626,	output: -0.0450,	loss:
0.2809			
i: 294,	target: -0.0499,	output: -0.0014,	loss:
0.9720			
i: 295,	target: -0.0161,	output: -0.0563,	loss:
2.4899			
i: 296,	target: 0.3032,	output: 0.2126,	loss:

0.2987			
i: 297,	target: -0.0083,	output: 0.0296,	loss:
4.5835			
i: 298,	target: 0.1281,	output: 0.1007,	loss:
0.2136			
i: 299,	target: -0.0781,	output: -0.0523,	loss:
0.3309			
i: 300,	target: -0.0814,	output: -0.0715,	loss:
0.1209			
i: 301,	target: -0.0724,	output: -0.0727,	loss:
0.0048			
i: 302,	target: -0.0921,	output: -0.0569,	loss:
0.3827			
i: 303,	target: -0.0655,	output: -0.0250,	loss:
0.6180			
i: 304,	target: -0.0634,	output: -0.0378,	loss:
0.4034			
i: 305,	target: 0.0478,	output: 0.0208,	loss:
0.5661			
i: 306,	target: -0.1039,	output: -0.0671,	loss:
0.3542			
i: 307,	target: -0.0585,	output: -0.0571,	loss:
0.0244			
i: 308,	target: -0.0483,	output: -0.0618,	loss:
0.2780			
i: 309,	target: 0.1958,	output: 0.1730,	loss:
0.1166			
i: 310,	target: -0.0971,	output: -0.0751,	loss:
0.2270			
i: 311,	target: -0.0836,	output: -0.0699,	loss:
0.1641			
i: 312,	target: 0.2212,	output: 0.1959,	loss:
0.1143			
i: 313,	target: 0.1918,	output: 0.1274,	loss:
0.3355			
i: 314,	target: -0.0706,	output: -0.0438,	loss:
0.3797			
i: 315,	target: -0.0390,	output: -0.0502,	loss:
0.2868			
i: 316,	target: 0.2756,	output: 0.2442,	loss:
0.1142			
i: 317,	target: -0.0460,	output: -0.0469,	loss:
0.0199			
i: 318,	target: 0.0353,	output: 0.0010,	loss:
0.9707			
i: 319,	target: -0.0717,	output: -0.0542,	loss:
0.2444			
i: 320,	target: -0.0669,	output: -0.0575,	loss:

0.1408			
i: 321,	target: -0.0666,	output: -0.0383,	loss:
0.4246			
i: 322,	target: -0.0460,	output: -0.0766,	loss:
0.6675			
i: 323,	target: -0.0008,	output: 0.0369,	loss:
48.2702			
i: 324,	target: 0.1852,	output: 0.1287,	loss:
0.3051			
i: 325,	target: -0.0799,	output: -0.0725,	loss:
0.0924			
i: 326,	target: 0.3618,	output: 0.3092,	loss:
0.1453			
i: 327,	target: -0.0663,	output: -0.0701,	loss:
0.0566			
i: 328,	target: -0.0718,	output: -0.0684,	loss:
0.0467			
i: 329,	target: -0.0646,	output: -0.0719,	loss:
0.1138			
i: 330,	target: 0.0997,	output: 0.1303,	loss:
0.3074			
i: 331,	target: 0.1503,	output: 0.1452,	loss:
0.0340			
i: 332,	target: 0.1550,	output: 0.1555,	loss:
0.0032			
i: 333,	target: -0.0276,	output: -0.0082,	loss:
0.7018			
i: 334,	target: -0.0791,	output: -0.0596,	loss:
0.2461			
i: 335,	target: 0.2224,	output: 0.2307,	loss:
0.0372			
i: 336,	target: -0.0820,	output: -0.0665,	loss:
0.1892			
i: 337,	target: -0.0456,	output: -0.0641,	loss:
0.4062			
i: 338,	target: -0.0647,	output: -0.0746,	loss:
0.1542			
i: 339,	target: -0.0594,	output: -0.0564,	loss:
0.0500			
i: 340,	target: -0.0586,	output: -0.0703,	loss:
0.2007			
i: 341,	target: -0.0788,	output: -0.0669,	loss:
0.1511			
i: 342,	target: -0.0782,	output: -0.0420,	loss:
0.4629			
i: 343,	target: -0.0664,	output: -0.0134,	loss:
0.7982			
i: 344,	target: -0.0507,	output: -0.0767,	loss:



0.5151			
i: 345,	target: -0.0782,	output: -0.0756,	loss:
0.0341			
i: 346,	target: -0.0393,	output: -0.0520,	loss:
0.3249			
i: 347,	target: -0.0966,	output: -0.0619,	loss:
0.3591			
i: 348,	target: -0.0416,	output: -0.0473,	loss:
0.1372			
i: 349,	target: -0.1101,	output: -0.0724,	loss:
0.3423			
i: 350,	target: -0.0674,	output: -0.0328,	loss:
0.5141			
i: 351,	target: -0.0595,	output: -0.0229,	loss:
0.6142			
i: 352,	target: -0.0449,	output: -0.0436,	loss:
0.0272			
i: 353,	target: 0.1662,	output: 0.1102,	loss:
0.3368			
i: 354,	target: -0.0498,	output: -0.0718,	loss:
0.4420			
i: 355,	target: 0.0275,	output: 0.0344,	loss:
0.2496			
i: 356,	target: 0.1454,	output: 0.1198,	loss:
0.1760			
i: 357,	target: -0.0638,	output: -0.0675,	loss:
0.0577			
i: 358,	target: 0.1771,	output: 0.1529,	loss:
0.1368			
i: 359,	target: -0.0530,	output: -0.0273,	loss:
0.4856			
i: 360,	target: 0.1273,	output: 0.1549,	loss:
0.2164			
i: 361,	target: -0.0809,	output: -0.0116,	loss:
0.8572			
i: 362,	target: 0.1108,	output: 0.0751,	loss:
0.3220			
i: 363,	target: 0.1792,	output: 0.1121,	loss:
0.3743			
i: 364,	target: 0.0872,	output: 0.1145,	loss:
0.3129			
i: 365,	target: -0.0938,	output: -0.0476,	loss:
0.4929			
i: 366,	target: 0.2210,	output: 0.1386,	loss:
0.3729			
i: 367,	target: 0.1902,	output: 0.1653,	loss:
0.1310			
i: 368,	target: -0.0007,	output: -0.0042,	loss:

4.7054			
i: 369,	target: -0.0617,	output: 0.0204,	loss:
1.3309			
i: 370,	target: 0.1377,	output: 0.1014,	loss:
0.2640			
i: 371,	target: -0.0671,	output: -0.0059,	loss:
0.9119			
i: 372,	target: -0.0648,	output: -0.0484,	loss:
0.2526			
i: 373,	target: 0.0130,	output: 0.0169,	loss:
0.2991			
i: 374,	target: -0.0775,	output: -0.0761,	loss:
0.0178			
i: 375,	target: -0.0518,	output: -0.0698,	loss:
0.3488			
i: 376,	target: -0.0650,	output: -0.0299,	loss:
0.5401			
i: 377,	target: 0.2207,	output: 0.1688,	loss:
0.2351			
i: 378,	target: -0.0523,	output: -0.0170,	loss:
0.6752			
i: 379,	target: -0.0794,	output: -0.0549,	loss:
0.3089			
i: 380,	target: 0.1424,	output: 0.0997,	loss:
0.2996			
i: 381,	target: 0.2154,	output: 0.1342,	loss:
0.3772			
i: 382,	target: -0.0955,	output: -0.0801,	loss:
0.1611			
i: 383,	target: -0.0239,	output: -0.0286,	loss:
0.1970			
i: 384,	target: -0.0720,	output: -0.0681,	loss:
0.0530			
i: 385,	target: 0.2714,	output: 0.1577,	loss:
0.4189			
i: 386,	target: 0.1225,	output: 0.0943,	loss:
0.2300			
i: 387,	target: -0.0394,	output: -0.0622,	loss:
0.5779			
i: 388,	target: 0.1568,	output: 0.1668,	loss:
0.0633			
i: 389,	target: -0.0793,	output: -0.0326,	loss:
0.5885			
i: 390,	target: -0.0616,	output: -0.0611,	loss:
0.0080			
i: 391,	target: -0.0767,	output: -0.0482,	loss:
0.3718			
i: 392,	target: -0.0660,	output: -0.0338,	loss:

0.4880			
i: 393,	target: 0.0436,	output: 0.0294,	loss:
0.3247			
i: 394,	target: 0.1271,	output: 0.0974,	loss:
0.2342			
i: 395,	target: -0.0814,	output: -0.0727,	loss:
0.1070			
i: 396,	target: 0.0389,	output: 0.0225,	loss:
0.4218			
i: 397,	target: 0.1601,	output: 0.1089,	loss:
0.3195			
i: 398,	target: -0.0725,	output: -0.0248,	loss:
0.6582			
i: 399,	target: 0.1110,	output: 0.1075,	loss:
0.0319			
i: 400,	target: -0.0226,	output: -0.0078,	loss:
0.6566			
i: 401,	target: -0.0457,	output: -0.0401,	loss:
0.1229			
i: 402,	target: 0.0882,	output: 0.0998,	loss:
0.1319			
i: 403,	target: 0.1984,	output: 0.1281,	loss:
0.3541			
i: 404,	target: -0.0830,	output: -0.0669,	loss:
0.1939			
i: 405,	target: -0.0898,	output: -0.0657,	loss:
0.2680			
i: 406,	target: 0.2105,	output: 0.1573,	loss:
0.2525			
i: 407,	target: 0.1611,	output: 0.1354,	loss:
0.1595			
i: 408,	target: -0.0665,	output: -0.0531,	loss:
0.2010			
i: 409,	target: 0.2159,	output: 0.1939,	loss:
0.1017			
i: 410,	target: 0.1753,	output: 0.1096,	loss:
0.3747			
i: 411,	target: 0.1750,	output: 0.1171,	loss:
0.3311			
i: 412,	target: 0.0272,	output: -0.0714,	loss:
3.6234			
i: 413,	target: 0.2065,	output: 0.1613,	loss:
0.2191			
i: 414,	target: 0.1612,	output: 0.0906,	loss:
0.4378			
i: 415,	target: -0.0175,	output: -0.0355,	loss:
1.0290			
i: 416,	target: 0.2223,	output: 0.2061,	loss:

0.0729			
i: 417,	target: 0.0235,	output: 0.0213,	loss:
0.0931			
i: 418,	target: -0.0567,	output: -0.0628,	loss:
0.1078			
i: 419,	target: -0.0587,	output: -0.0569,	loss:
0.0307			
i: 420,	target: 0.0951,	output: 0.0960,	loss:
0.0100			
i: 421,	target: 0.1883,	output: 0.1509,	loss:
0.1988			
i: 422,	target: -0.0714,	output: -0.0493,	loss:
0.3088			
i: 423,	target: 0.2277,	output: 0.0726,	loss:
0.6812			
i: 424,	target: 0.2147,	output: 0.1330,	loss:
0.3805			
i: 425,	target: -0.0889,	output: -0.0687,	loss:
0.2278			
i: 426,	target: 0.4629,	output: 0.3237,	loss:
0.3007			
i: 427,	target: -0.0813,	output: -0.0242,	loss:
0.7024			
i: 428,	target: 0.1574,	output: 0.1373,	loss:
0.1276			
i: 429,	target: 0.1433,	output: 0.1107,	loss:
0.2274			
i: 430,	target: 0.0955,	output: 0.1157,	loss:
0.2114			
i: 431,	target: 0.0447,	output: 0.0285,	loss:
0.3634			
i: 432,	target: -0.0662,	output: -0.0742,	loss:
0.1196			
i: 433,	target: -0.0694,	output: -0.0483,	loss:
0.3033			
i: 434,	target: 0.1016,	output: 0.0906,	loss:
0.1086			
i: 435,	target: -0.0749,	output: -0.0538,	loss:
0.2815			
i: 436,	target: 0.1783,	output: 0.1649,	loss:
0.0747			
i: 437,	target: 0.2238,	output: 0.1729,	loss:
0.2277			
i: 438,	target: 0.1714,	output: 0.1299,	loss:
0.2417			
i: 439,	target: -0.0661,	output: -0.0718,	loss:
0.0861			
i: 440,	target: -0.0518,	output: -0.0453,	loss:

0.1262			
i: 441,	target: 0.2215,	output: 0.2240,	loss:
0.0113			
i: 442,	target: -0.0816,	output: -0.0731,	loss:
0.1046			
i: 443,	target: -0.0746,	output: -0.0570,	loss:
0.2354			
i: 444,	target: -0.0811,	output: -0.0505,	loss:
0.3771			
i: 445,	target: 0.1906,	output: 0.1776,	loss:
0.0686			
i: 446,	target: -0.0793,	output: -0.0448,	loss:
0.4350			
i: 447,	target: -0.0638,	output: -0.0364,	loss:
0.4300			
i: 448,	target: -0.0544,	output: -0.0658,	loss:
0.2101			
i: 449,	target: -0.0733,	output: -0.0630,	loss:
0.1409			
i: 450,	target: -0.0685,	output: -0.0589,	loss:
0.1407			
i: 451,	target: -0.0815,	output: -0.0610,	loss:
0.2521			
i: 452,	target: 0.1670,	output: 0.1329,	loss:
0.2043			
i: 453,	target: 0.0851,	output: 0.1216,	loss:
0.4292			
i: 454,	target: 0.0393,	output: 0.0053,	loss:
0.8652			
i: 455,	target: -0.0277,	output: -0.0556,	loss:
1.0103			
i: 456,	target: -0.0685,	output: -0.0709,	loss:
0.0342			
i: 457,	target: -0.0435,	output: -0.0411,	loss:
0.0537			
i: 458,	target: -0.0292,	output: -0.0019,	loss:
0.9351			
i: 459,	target: 0.0513,	output: 0.0804,	loss:
0.5668			
i: 460,	target: -0.0767,	output: -0.0596,	loss:
0.2224			
i: 461,	target: 0.2070,	output: 0.1479,	loss:
0.2856			
i: 462,	target: 0.2130,	output: 0.1740,	loss:
0.1830			
i: 463,	target: -0.0346,	output: -0.0470,	loss:
0.3604			
i: 464,	target: -0.0787,	output: -0.0354,	loss:

0.5503			
i: 465,	target: -0.0631,	output: -0.0570,	loss:
0.0968			
i: 466,	target: -0.0619,	output: -0.0556,	loss:
0.1025			
i: 467,	target: 0.0164,	output: 0.0275,	loss:
0.6721			
i: 468,	target: -0.0616,	output: -0.0651,	loss:
0.0567			
i: 469,	target: -0.0733,	output: -0.0834,	loss:
0.1387			
i: 470,	target: -0.0434,	output: -0.0643,	loss:
0.4813			
i: 471,	target: 0.1200,	output: 0.1288,	loss:
0.0734			
i: 472,	target: 0.1073,	output: 0.0370,	loss:
0.6556			
i: 473,	target: 0.1491,	output: 0.1457,	loss:
0.0228			
i: 474,	target: 0.0633,	output: 0.0022,	loss:
0.9659			
i: 475,	target: 0.2512,	output: 0.1323,	loss:
0.4733			
i: 476,	target: 0.1754,	output: 0.0926,	loss:
0.4719			
i: 477,	target: 0.3048,	output: 0.3112,	loss:
0.0210			
i: 478,	target: -0.0498,	output: -0.0008,	loss:
0.9847			
i: 479,	target: -0.0460,	output: -0.0711,	loss:
0.5462			
i: 480,	target: -0.0468,	output: -0.0482,	loss:
0.0290			
i: 481,	target: 0.2446,	output: 0.1512,	loss:
0.3819			
i: 482,	target: 0.1110,	output: 0.0632,	loss:
0.4302			
i: 483,	target: -0.0810,	output: -0.0647,	loss:
0.2014			
i: 484,	target: -0.0851,	output: -0.0414,	loss:
0.5138			
i: 485,	target: -0.0686,	output: -0.0584,	loss:
0.1486			
i: 486,	target: -0.0783,	output: -0.0443,	loss:
0.4335			
i: 487,	target: -0.0553,	output: -0.0516,	loss:
0.0663			
i: 488,	target: 0.1567,	output: 0.0376,	loss:

0.7599			
i: 489,	target: 0.1320,	output: 0.1247,	loss:
0.0553			
i: 490,	target: -0.0750,	output: -0.0653,	loss:
0.1293			
i: 491,	target: 0.1538,	output: 0.1414,	loss:
0.0803			
i: 492,	target: 0.1790,	output: 0.1663,	loss:
0.0711			
i: 493,	target: 0.0494,	output: 0.0980,	loss:
0.9841			
i: 494,	target: -0.0185,	output: -0.0382,	loss:
1.0628			
i: 495,	target: -0.0593,	output: -0.0493,	loss:
0.1693			
i: 496,	target: 0.1853,	output: 0.1321,	loss:
0.2874			
i: 497,	target: 0.1167,	output: 0.1118,	loss:
0.0421			
i: 498,	target: -0.0753,	output: -0.0503,	loss:
0.3320			
i: 499,	target: 0.1846,	output: 0.1794,	loss:
0.0283			
i: 500,	target: -0.0610,	output: -0.0714,	loss:
0.1710			
i: 501,	target: -0.0342,	output: -0.0048,	loss:
0.8609			
i: 502,	target: -0.0447,	output: -0.0372,	loss:
0.1669			
i: 503,	target: -0.0751,	output: -0.0737,	loss:
0.0174			
i: 504,	target: 0.1935,	output: 0.1606,	loss:
0.1701			
i: 505,	target: 0.1344,	output: 0.0834,	loss:
0.3798			
i: 506,	target: 0.0032,	output: 0.0324,	loss:
9.1857			
i: 507,	target: -0.0655,	output: -0.0234,	loss:
0.6430			
i: 508,	target: 0.0357,	output: 0.0046,	loss:
0.8704			
i: 509,	target: -0.1011,	output: -0.0648,	loss:
0.3596			
i: 510,	target: 0.1518,	output: 0.1629,	loss:
0.0734			
i: 511,	target: -0.0768,	output: -0.0597,	loss:
0.2219			
i: 512,	target: 0.0263,	output: 0.0732,	loss:

1.7835			
i: 513,	target: -0.0640,	output: -0.0579,	loss:
0.0956			
i: 514,	target: 0.1435,	output: 0.1206,	loss:
0.1592			
i: 515,	target: 0.0058,	output: -0.0075,	loss:
2.2935			
i: 516,	target: -0.0163,	output: -0.0446,	loss:
1.7379			
i: 517,	target: 0.0217,	output: 0.0384,	loss:
0.7639			
i: 518,	target: 0.1739,	output: 0.1023,	loss:
0.4116			
i: 519,	target: 0.2265,	output: 0.2236,	loss:
0.0127			
i: 520,	target: -0.0480,	output: -0.0580,	loss:
0.2080			
i: 521,	target: 0.1236,	output: 0.1763,	loss:
0.4263			
i: 522,	target: 0.1696,	output: 0.1088,	loss:
0.3586			
i: 523,	target: -0.0715,	output: -0.0523,	loss:
0.2693			
i: 524,	target: 0.0420,	output: 0.0520,	loss:
0.2382			
i: 525,	target: -0.0431,	output: -0.0590,	loss:
0.3681			
i: 526,	target: 0.1981,	output: 0.1539,	loss:
0.2231			
i: 527,	target: -0.0820,	output: -0.0477,	loss:
0.4178			
i: 528,	target: -0.0879,	output: -0.0671,	loss:
0.2372			
i: 529,	target: 0.0485,	output: 0.0494,	loss:
0.0176			
i: 530,	target: -0.0357,	output: -0.0836,	loss:
1.3431			
i: 531,	target: -0.0563,	output: -0.0655,	loss:
0.1641			
i: 532,	target: 0.0025,	output: 0.0208,	loss:
7.3457			
i: 533,	target: 0.2063,	output: 0.1770,	loss:
0.1421			
i: 534,	target: -0.0742,	output: -0.0599,	loss:
0.1933			
i: 535,	target: 0.1375,	output: 0.1253,	loss:
0.0889			
i: 536,	target: 0.0473,	output: 0.0481,	loss:



0.0167			
i: 537,	target: 0.1739,	output: 0.1465,	loss:
0.1577			
i: 538,	target: 0.1847,	output: 0.1513,	loss:
0.1805			
i: 539,	target: -0.0792,	output: -0.0445,	loss:
0.4379			
i: 540,	target: 0.2710,	output: 0.1421,	loss:
0.4758			
i: 541,	target: 0.2079,	output: 0.0916,	loss:
0.5595			
i: 542,	target: 0.2020,	output: 0.1907,	loss:
0.0563			
i: 543,	target: 0.0425,	output: 0.0650,	loss:
0.5278			
i: 544,	target: 0.3090,	output: 0.3043,	loss:
0.0150			
i: 545,	target: -0.0852,	output: -0.0234,	loss:
0.7250			
i: 546,	target: -0.0765,	output: -0.0223,	loss:
0.7078			
i: 547,	target: -0.1115,	output: -0.0792,	loss:
0.2894			
i: 548,	target: 0.2215,	output: 0.1983,	loss:
0.1047			
i: 549,	target: 0.0678,	output: 0.0043,	loss:
0.9365			
i: 550,	target: 0.0416,	output: 0.0175,	loss:
0.5803			
i: 551,	target: -0.0676,	output: -0.0451,	loss:
0.3331			
i: 552,	target: 0.1046,	output: 0.0678,	loss:
0.3515			
i: 553,	target: 0.0945,	output: 0.1354,	loss:
0.4325			
i: 554,	target: -0.0904,	output: -0.0639,	loss:
0.2932			
i: 555,	target: 0.1414,	output: 0.1749,	loss:
0.2362			
i: 556,	target: -0.1138,	output: -0.0661,	loss:
0.4196			
i: 557,	target: -0.0697,	output: -0.0651,	loss:
0.0657			
i: 558,	target: -0.0462,	output: -0.0745,	loss:
0.6125			
i: 559,	target: 0.0019,	output: 0.1202,	loss:
63.9064			
i: 560,	target: -0.0789,	output: -0.0552,	loss:

0.3010			
i: 561,	target: 0.1661,	output: 0.1625,	loss:
0.0218			
i: 562,	target: -0.0761,	output: -0.0773,	loss:
0.0149			
i: 563,	target: -0.0537,	output: 0.0049,	loss:
1.0912			
i: 564,	target: -0.0641,	output: -0.0469,	loss:
0.2682			
i: 565,	target: -0.0909,	output: -0.0523,	loss:
0.4248			
i: 566,	target: -0.0007,	output: 0.0555,	loss:
77.0618			
i: 567,	target: 0.0199,	output: 0.1266,	loss:
5.3765			
i: 568,	target: 0.1781,	output: 0.1046,	loss:
0.4127			
i: 569,	target: 0.1418,	output: 0.1434,	loss:
0.0111			
i: 570,	target: -0.0389,	output: -0.0404,	loss:
0.0399			
i: 571,	target: 0.2021,	output: 0.1616,	loss:
0.2005			
i: 572,	target: 0.1765,	output: 0.1787,	loss:
0.0123			
i: 573,	target: -0.0759,	output: -0.0679,	loss:
0.1060			
i: 574,	target: -0.0717,	output: -0.0705,	loss:
0.0158			
i: 575,	target: -0.0612,	output: -0.0478,	loss:
0.2190			
i: 576,	target: 0.0238,	output: 0.0478,	loss:
1.0073			
i: 577,	target: -0.0422,	output: -0.0415,	loss:
0.0154			
i: 578,	target: 0.1926,	output: 0.1469,	loss:
0.2372			
i: 579,	target: 0.2281,	output: 0.2425,	loss:
0.0633			
i: 580,	target: 0.1637,	output: 0.0729,	loss:
0.5546			
i: 581,	target: 0.2755,	output: 0.1487,	loss:
0.4604			
i: 582,	target: 0.0334,	output: -0.0116,	loss:
1.3481			
i: 583,	target: 0.1855,	output: 0.1004,	loss:
0.4586			
i: 584,	target: -0.0553,	output: -0.0311,	loss:

0.4368			
i: 585,	target: 0.2601,	output: 0.2350,	loss:
0.0967			
i: 586,	target: 0.1130,	output: 0.0820,	loss:
0.2746			
i: 587,	target: -0.0953,	output: -0.0520,	loss:
0.4543			
i: 588,	target: -0.0508,	output: -0.0024,	loss:
0.9520			
i: 589,	target: -0.0589,	output: -0.0755,	loss:
0.2832			
i: 590,	target: -0.0812,	output: -0.0433,	loss:
0.4670			
i: 591,	target: -0.0687,	output: -0.0730,	loss:
0.0637			
i: 592,	target: 0.2247,	output: 0.1506,	loss:
0.3297			
i: 593,	target: -0.0624,	output: 0.0239,	loss:
1.3834			
i: 594,	target: 0.0381,	output: -0.0000,	loss:
1.0010			
i: 595,	target: 0.1572,	output: 0.1484,	loss:
0.0564			
i: 596,	target: -0.0721,	output: -0.0530,	loss:
0.2645			
i: 597,	target: -0.0969,	output: -0.0580,	loss:
0.4013			
i: 598,	target: -0.0568,	output: -0.0356,	loss:
0.3742			
i: 599,	target: -0.1107,	output: -0.0517,	loss:
0.5328			
i: 600,	target: -0.0647,	output: -0.0557,	loss:
0.1397			
i: 601,	target: 0.4301,	output: 0.3224,	loss:
0.2503			
i: 602,	target: 0.1073,	output: 0.1044,	loss:
0.0270			
i: 603,	target: 0.2291,	output: 0.2762,	loss:
0.2055			
i: 604,	target: -0.0537,	output: -0.0133,	loss:
0.7514			
i: 605,	target: 0.1523,	output: 0.1220,	loss:
0.1989			
i: 606,	target: 0.0271,	output: 0.0938,	loss:
2.4603			
i: 607,	target: 0.0739,	output: 0.0187,	loss:
0.7472			
i: 608,	target: 0.1950,	output: 0.2164,	loss:

0.1097			
i: 609,	target: -0.0466,	output: -0.0116,	loss:
0.7508			
i: 610,	target: -0.0832,	output: -0.0461,	loss:
0.4459			
i: 611,	target: 0.1953,	output: 0.1170,	loss:
0.4009			
i: 612,	target: -0.0212,	output: -0.0347,	loss:
0.6342			
i: 613,	target: -0.0596,	output: -0.0585,	loss:
0.0179			
i: 614,	target: 0.1964,	output: 0.2002,	loss:
0.0195			
i: 615,	target: -0.0496,	output: -0.0318,	loss:
0.3594			
i: 616,	target: -0.0445,	output: -0.0359,	loss:
0.1932			
i: 617,	target: 0.3335,	output: 0.3132,	loss:
0.0609			
i: 618,	target: 0.1929,	output: 0.2258,	loss:
0.1706			
i: 619,	target: 0.1153,	output: 0.0395,	loss:
0.6571			
i: 620,	target: -0.0723,	output: -0.0360,	loss:
0.5029			
i: 621,	target: -0.0663,	output: -0.0678,	loss:
0.0237			
i: 622,	target: 0.1968,	output: 0.1316,	loss:
0.3312			
i: 623,	target: 0.1433,	output: 0.1155,	loss:
0.1942			
i: 624,	target: -0.0375,	output: -0.0788,	loss:
1.1000			
i: 625,	target: -0.0492,	output: -0.0208,	loss:
0.5767			
i: 626,	target: 0.1860,	output: 0.1502,	loss:
0.1924			
i: 627,	target: -0.0438,	output: -0.0385,	loss:
0.1210			
i: 628,	target: -0.0904,	output: -0.0707,	loss:
0.2180			
i: 629,	target: 0.1715,	output: 0.2118,	loss:
0.2350			
i: 630,	target: 0.2430,	output: 0.1780,	loss:
0.2675			
i: 631,	target: 0.1503,	output: 0.1135,	loss:
0.2448			
i: 632,	target: 0.0159,	output: 0.0256,	loss:

0.6094			
i: 633,	target: 0.0732,	output: 0.0121,	loss:
0.8347			
i: 634,	target: 0.0631,	output: 0.0293,	loss:
0.5359			
i: 635,	target: -0.0739,	output: -0.0567,	loss:
0.2333			
i: 636,	target: 0.1655,	output: 0.0986,	loss:
0.4040			
i: 637,	target: 0.1390,	output: 0.0865,	loss:
0.3777			
i: 638,	target: -0.0480,	output: -0.0579,	loss:
0.2060			
i: 639,	target: -0.0799,	output: -0.0596,	loss:
0.2547			
i: 640,	target: 0.2141,	output: 0.2045,	loss:
0.0449			
i: 641,	target: -0.0755,	output: -0.0597,	loss:
0.2093			
i: 642,	target: 0.1759,	output: 0.1724,	loss:
0.0203			
i: 643,	target: 0.0811,	output: 0.0554,	loss:
0.3161			
i: 644,	target: -0.0843,	output: -0.0825,	loss:
0.0217			
i: 645,	target: 0.2098,	output: 0.1536,	loss:
0.2679			
i: 646,	target: -0.0512,	output: -0.0672,	loss:
0.3108			
i: 647,	target: -0.0707,	output: -0.0674,	loss:
0.0462			
i: 648,	target: -0.0490,	output: -0.0428,	loss:
0.1268			
i: 649,	target: -0.0800,	output: -0.0438,	loss:
0.4520			
i: 650,	target: 0.1879,	output: 0.1114,	loss:
0.4074			
i: 651,	target: -0.0476,	output: -0.0117,	loss:
0.7539			
i: 652,	target: 0.1325,	output: 0.1132,	loss:
0.1453			
i: 653,	target: -0.0425,	output: -0.0409,	loss:
0.0377			
i: 654,	target: -0.0759,	output: -0.0459,	loss:
0.3953			
i: 655,	target: -0.0216,	output: -0.0248,	loss:
0.1468			
i: 656,	target: -0.0940,	output: -0.0458,	loss:

0.5123			
i: 657,	target: -0.0459,	output: -0.0716,	loss:
0.5611			
i: 658,	target: 0.1665,	output: 0.1651,	loss:
0.0084			
i: 659,	target: -0.0445,	output: -0.0763,	loss:
0.7152			
i: 660,	target: -0.0488,	output: -0.0584,	loss:
0.1970			
i: 661,	target: 0.0480,	output: -0.0099,	loss:
1.2052			
i: 662,	target: -0.0875,	output: -0.0681,	loss:
0.2220			
i: 663,	target: 0.0028,	output: 0.1043,	loss:
35.9639			
i: 664,	target: 0.2111,	output: 0.1443,	loss:
0.3167			
i: 665,	target: -0.0768,	output: -0.0593,	loss:
0.2278			
i: 666,	target: 0.1403,	output: 0.1372,	loss:
0.0223			
i: 667,	target: -0.0360,	output: -0.0157,	loss:
0.5637			
i: 668,	target: 0.0661,	output: 0.0835,	loss:
0.2629			
i: 669,	target: 0.1937,	output: 0.1315,	loss:
0.3209			
i: 670,	target: -0.0733,	output: -0.0811,	loss:
0.1069			
i: 671,	target: -0.0668,	output: -0.0080,	loss:
0.8808			
i: 672,	target: 0.1160,	output: 0.1124,	loss:
0.0311			
i: 673,	target: -0.0418,	output: -0.0661,	loss:
0.5804			
i: 674,	target: 0.0655,	output: 0.0668,	loss:
0.0205			
i: 675,	target: 0.2286,	output: 0.2042,	loss:
0.1070			
i: 676,	target: 0.1040,	output: 0.0583,	loss:
0.4397			
i: 677,	target: 0.1043,	output: 0.0624,	loss:
0.4021			
i: 678,	target: -0.0748,	output: -0.0381,	loss:
0.4900			
i: 679,	target: 0.2032,	output: 0.1620,	loss:
0.2025			
i: 680,	target: -0.0656,	output: -0.0701,	loss:

0.0689			
i: 681,	target: 0.0052,	output: -0.0237,	loss:
5.6023			
i: 682,	target: 0.1304,	output: 0.1284,	loss:
0.0152			
i: 683,	target: -0.0691,	output: -0.0670,	loss:
0.0304			
i: 684,	target: -0.1098,	output: -0.0756,	loss:
0.3111			
i: 685,	target: -0.0695,	output: -0.0736,	loss:
0.0599			
i: 686,	target: 0.3072,	output: 0.2617,	loss:
0.1481			
i: 687,	target: -0.0952,	output: 0.0220,	loss:
1.2310			
i: 688,	target: -0.0768,	output: -0.0643,	loss:
0.1629			
i: 689,	target: -0.0832,	output: -0.0373,	loss:
0.5522			
i: 690,	target: -0.0490,	output: -0.0375,	loss:
0.2335			
i: 691,	target: -0.0725,	output: -0.0535,	loss:
0.2616			
i: 692,	target: -0.0412,	output: -0.0588,	loss:
0.4295			
i: 693,	target: 0.1402,	output: 0.1347,	loss:
0.0392			
i: 694,	target: -0.1116,	output: -0.0709,	loss:
0.3649			
i: 695,	target: -0.0551,	output: -0.0468,	loss:
0.1513			
i: 696,	target: -0.0914,	output: -0.0455,	loss:
0.5024			
i: 697,	target: -0.0516,	output: -0.0481,	loss:
0.0684			
i: 698,	target: -0.0560,	output: -0.0271,	loss:
0.5158			
i: 699,	target: 0.2912,	output: 0.2395,	loss:
0.1775			
i: 700,	target: 0.1332,	output: 0.0824,	loss:
0.3815			
i: 701,	target: -0.0831,	output: -0.0603,	loss:
0.2746			
i: 702,	target: -0.0701,	output: -0.0499,	loss:
0.2871			
i: 703,	target: 0.0062,	output: -0.0315,	loss:
6.1270			
i: 704,	target: 0.0359,	output: 0.0500,	loss:

0.3919			
i: 705,	target: 0.1924,	output: 0.1530,	loss:
0.2046			
i: 706,	target: 0.1243,	output: 0.0470,	loss:
0.6217			
i: 707,	target: -0.0368,	output: -0.0067,	loss:
0.8189			
i: 708,	target: 0.1656,	output: 0.1112,	loss:
0.3289			
i: 709,	target: -0.0674,	output: -0.0694,	loss:
0.0304			
i: 710,	target: 0.1986,	output: 0.1299,	loss:
0.3458			
i: 711,	target: 0.1747,	output: 0.1195,	loss:
0.3161			
i: 712,	target: -0.0397,	output: -0.0689,	loss:
0.7385			
i: 713,	target: 0.0283,	output: 0.0279,	loss:
0.0128			
i: 714,	target: -0.0792,	output: -0.0445,	loss:
0.4382			
i: 715,	target: 0.0830,	output: 0.0948,	loss:
0.1421			
i: 716,	target: 0.0921,	output: 0.1344,	loss:
0.4585			
i: 717,	target: -0.0725,	output: -0.0818,	loss:
0.1276			
i: 718,	target: -0.0737,	output: -0.0555,	loss:
0.2474			
i: 719,	target: -0.0792,	output: -0.0407,	loss:
0.4862			
i: 720,	target: 0.0365,	output: 0.0584,	loss:
0.5971			
i: 721,	target: -0.0361,	output: -0.0860,	loss:
1.3826			
i: 722,	target: -0.0609,	output: -0.0757,	loss:
0.2426			
i: 723,	target: -0.0742,	output: -0.0060,	loss:
0.9195			
i: 724,	target: -0.0758,	output: -0.0625,	loss:
0.1756			
i: 725,	target: -0.0791,	output: -0.0727,	loss:
0.0811			
i: 726,	target: -0.0484,	output: -0.0699,	loss:
0.4430			
i: 727,	target: 0.1287,	output: 0.0967,	loss:
0.2485			
i: 728,	target: 0.0893,	output: 0.1461,	loss:



0.6373			
i: 729,	target: -0.0862,	output: -0.0413,	loss:
0.5214			
i: 730,	target: -0.0832,	output: -0.0634,	loss:
0.2386			
i: 731,	target: 0.0665,	output: -0.0073,	loss:
1.1096			
i: 732,	target: 0.1588,	output: 0.1799,	loss:
0.1323			
i: 733,	target: 0.0638,	output: 0.0442,	loss:
0.3077			
i: 734,	target: -0.1044,	output: -0.0594,	loss:
0.4311			
i: 735,	target: -0.0578,	output: -0.0566,	loss:
0.0220			
i: 736,	target: -0.0655,	output: -0.0492,	loss:
0.2482			
i: 737,	target: -0.0911,	output: -0.0617,	loss:
0.3231			
i: 738,	target: -0.0338,	output: 0.0579,	loss:
2.7139			
i: 739,	target: -0.0708,	output: -0.0577,	loss:
0.1851			
i: 740,	target: -0.0476,	output: -0.0470,	loss:
0.0128			
i: 741,	target: -0.1141,	output: -0.0556,	loss:
0.5130			
i: 742,	target: 0.0751,	output: 0.0780,	loss:
0.0381			
i: 743,	target: 0.3540,	output: 0.2875,	loss:
0.1878			
i: 744,	target: 0.1564,	output: 0.1283,	loss:
0.1793			
i: 745,	target: -0.1046,	output: -0.0580,	loss:
0.4459			
i: 746,	target: -0.0841,	output: -0.0763,	loss:
0.0927			
i: 747,	target: 0.1855,	output: 0.1191,	loss:
0.3578			
i: 748,	target: 0.2309,	output: 0.1847,	loss:
0.1999			
i: 749,	target: -0.0008,	output: -0.0658,	loss:
76.9746			
i: 750,	target: -0.0402,	output: -0.0556,	loss:
0.3834			
i: 751,	target: 0.2165,	output: 0.1338,	loss:
0.3819			
i: 752,	target: -0.0845,	output: -0.0558,	loss:

0.3397			
i: 753,	target: -0.0554,	output: -0.0398,	loss:
0.2810			
i: 754,	target: -0.0460,	output: -0.0164,	loss:
0.6423			
i: 755,	target: -0.0526,	output: -0.0517,	loss:
0.0180			
i: 756,	target: -0.0462,	output: 0.0390,	loss:
1.8429			
i: 757,	target: -0.0644,	output: 0.0053,	loss:
1.0817			
i: 758,	target: 0.1062,	output: 0.0150,	loss:
0.8585			
i: 759,	target: 0.4629,	output: 0.3237,	loss:
0.3007			
i: 760,	target: 0.0730,	output: 0.0945,	loss:
0.2940			
i: 761,	target: -0.0402,	output: -0.0592,	loss:
0.4709			
i: 762,	target: -0.0274,	output: -0.0323,	loss:
0.1788			
i: 763,	target: -0.0324,	output: -0.0539,	loss:
0.6641			
i: 764,	target: 0.0899,	output: 0.1586,	loss:
0.7636			
i: 765,	target: -0.0472,	output: -0.0534,	loss:
0.1314			
i: 766,	target: -0.0766,	output: -0.0646,	loss:
0.1573			
i: 767,	target: -0.0716,	output: -0.0286,	loss:
0.6002			
i: 768,	target: -0.0851,	output: -0.0582,	loss:
0.3154			
i: 769,	target: 0.1995,	output: 0.1799,	loss:
0.0981			
i: 770,	target: -0.0691,	output: -0.0450,	loss:
0.3484			
i: 771,	target: 0.1022,	output: 0.1277,	loss:
0.2504			
i: 772,	target: -0.0898,	output: -0.0339,	loss:
0.6230			
i: 773,	target: -0.1036,	output: -0.0636,	loss:
0.3862			
i: 774,	target: 0.1859,	output: 0.1168,	loss:
0.3715			
i: 775,	target: 0.1374,	output: 0.0890,	loss:
0.3523			
i: 776,	target: 0.0050,	output: 0.0003,	loss:

0.9476			
i: 777,	target: -0.0525,	output: 0.0387,	loss:
1.7378			
i: 778,	target: -0.0718,	output: -0.0027,	loss:
0.9631			
i: 779,	target: 0.2009,	output: 0.1890,	loss:
0.0594			
i: 780,	target: 0.1122,	output: 0.0511,	loss:
0.5447			
i: 781,	target: -0.0611,	output: -0.0428,	loss:
0.2995			
i: 782,	target: -0.0617,	output: -0.0704,	loss:
0.1415			
i: 783,	target: -0.0956,	output: -0.0335,	loss:
0.6497			
i: 784,	target: 0.1937,	output: 0.1038,	loss:
0.4642			
i: 785,	target: -0.0639,	output: -0.0417,	loss:
0.3465			
i: 786,	target: -0.0742,	output: -0.0642,	loss:
0.1349			
i: 787,	target: -0.0671,	output: -0.0593,	loss:
0.1164			
i: 788,	target: -0.0425,	output: -0.0566,	loss:
0.3309			
i: 789,	target: -0.0548,	output: -0.0501,	loss:
0.0846			
i: 790,	target: 0.3547,	output: 0.3262,	loss:
0.0804			
i: 791,	target: 0.1076,	output: 0.1415,	loss:
0.3145			
i: 792,	target: -0.0684,	output: -0.0687,	loss:
0.0042			
i: 793,	target: -0.0744,	output: -0.0413,	loss:
0.4452			
i: 794,	target: 0.2728,	output: 0.2199,	loss:
0.1938			
i: 795,	target: 0.0070,	output: -0.0500,	loss:
8.1091			
i: 796,	target: -0.0441,	output: -0.0628,	loss:
0.4217			
i: 797,	target: 0.1707,	output: 0.1434,	loss:
0.1595			
i: 798,	target: -0.0780,	output: -0.0538,	loss:
0.3094			
i: 799,	target: -0.0456,	output: -0.0205,	loss:
0.5503			
i: 800,	target: -0.0944,	output: -0.0283,	loss:

0.7003			
i: 801,	target: -0.0886,	output: -0.0675,	loss:
0.2380			
i: 802,	target: 0.0442,	output: 0.0606,	loss:
0.3722			
i: 803,	target: 0.3958,	output: 0.3121,	loss:
0.2113			
i: 804,	target: 0.4198,	output: 0.3249,	loss:
0.2260			
i: 805,	target: 0.0275,	output: 0.0037,	loss:
0.8638			
i: 806,	target: -0.0352,	output: -0.0314,	loss:
0.1085			
i: 807,	target: 0.0248,	output: 0.0451,	loss:
0.8229			
i: 808,	target: 0.1554,	output: 0.1099,	loss:
0.2926			
i: 809,	target: -0.0872,	output: -0.0797,	loss:
0.0860			
i: 810,	target: -0.0729,	output: -0.0187,	loss:
0.7438			
i: 811,	target: 0.0293,	output: 0.0223,	loss:
0.2393			
i: 812,	target: 0.1776,	output: 0.1756,	loss:
0.0111			
i: 813,	target: -0.0638,	output: -0.0405,	loss:
0.3659			
i: 814,	target: -0.0760,	output: -0.0463,	loss:
0.3908			
i: 815,	target: 0.2320,	output: 0.1790,	loss:
0.2285			
i: 816,	target: 0.1376,	output: 0.1156,	loss:
0.1596			
i: 817,	target: -0.0908,	output: -0.0649,	loss:
0.2849			
i: 818,	target: 0.0903,	output: 0.0430,	loss:
0.5232			
i: 819,	target: 0.1971,	output: 0.2137,	loss:
0.0840			
i: 820,	target: 0.2305,	output: 0.1491,	loss:
0.3532			
i: 821,	target: -0.0915,	output: -0.0339,	loss:
0.6293			
i: 822,	target: -0.0450,	output: -0.0572,	loss:
0.2702			
i: 823,	target: -0.0492,	output: -0.0775,	loss:
0.5774			
i: 824,	target: -0.0659,	output: -0.0735,	loss:

0.1156			
i: 825,	target: -0.0726,	output: -0.0552,	loss:
0.2395			
i: 826,	target: 0.1057,	output: 0.0859,	loss:
0.1869			
i: 827,	target: -0.0695,	output: -0.0536,	loss:
0.2287			
i: 828,	target: -0.0716,	output: -0.0646,	loss:
0.0980			
i: 829,	target: -0.0480,	output: -0.0303,	loss:
0.3682			
i: 830,	target: -0.0342,	output: -0.0745,	loss:
1.1765			
i: 831,	target: -0.0626,	output: -0.0303,	loss:
0.5161			
i: 832,	target: -0.0783,	output: -0.0765,	loss:
0.0235			
i: 833,	target: 0.4009,	output: 0.0581,	loss:
0.8550			
i: 834,	target: -0.0416,	output: -0.0482,	loss:
0.1585			
i: 835,	target: -0.0503,	output: -0.0813,	loss:
0.6157			
i: 836,	target: 0.1104,	output: 0.0886,	loss:
0.1975			
i: 837,	target: -0.0782,	output: -0.0555,	loss:
0.2906			
i: 838,	target: 0.0124,	output: -0.0163,	loss:
2.3210			
i: 839,	target: 0.2004,	output: 0.1944,	loss:
0.0303			
i: 840,	target: -0.0757,	output: -0.0263,	loss:
0.6524			
i: 841,	target: -0.0745,	output: -0.0722,	loss:
0.0312			
i: 842,	target: -0.0626,	output: -0.0731,	loss:
0.1679			
i: 843,	target: 0.1542,	output: 0.1463,	loss:
0.0508			
i: 844,	target: 0.0620,	output: 0.0887,	loss:
0.4305			
i: 845,	target: 0.1714,	output: 0.1928,	loss:
0.1248			
i: 846,	target: -0.0424,	output: -0.0716,	loss:
0.6903			
i: 847,	target: -0.0512,	output: -0.0417,	loss:
0.1846			
i: 848,	target: -0.0731,	output: -0.0470,	loss:

0.3571			
i: 849,	target: 0.3020,	output: 0.2840,	loss:
0.0596			
i: 850,	target: -0.0137,	output: -0.0496,	loss:
2.6329			
i: 851,	target: -0.0672,	output: -0.0603,	loss:
0.1025			
i: 852,	target: 0.2441,	output: 0.2139,	loss:
0.1237			
i: 853,	target: -0.0181,	output: -0.0437,	loss:
1.4149			
i: 854,	target: 0.1954,	output: 0.1533,	loss:
0.2153			
i: 855,	target: 0.1758,	output: 0.1869,	loss:
0.0633			
i: 856,	target: -0.0297,	output: -0.0444,	loss:
0.4950			
i: 857,	target: -0.0579,	output: -0.0666,	loss:
0.1494			
i: 858,	target: -0.0560,	output: 0.0150,	loss:
1.2681			
i: 859,	target: 0.1797,	output: 0.1108,	loss:
0.3833			
i: 860,	target: -0.0860,	output: -0.0370,	loss:
0.5695			
i: 861,	target: 0.0767,	output: 0.0586,	loss:
0.2355			
i: 862,	target: 0.1742,	output: 0.1898,	loss:
0.0896			
i: 863,	target: 0.0648,	output: 0.0630,	loss:
0.0270			
i: 864,	target: 0.0008,	output: -0.0564,	loss:
68.3605			
i: 865,	target: 0.2072,	output: 0.1586,	loss:
0.2346			
i: 866,	target: -0.0797,	output: -0.0488,	loss:
0.3878			
i: 867,	target: 0.0078,	output: 0.0186,	loss:
1.3723			
i: 868,	target: -0.0583,	output: -0.0697,	loss:
0.1946			
i: 869,	target: -0.0525,	output: -0.0261,	loss:
0.5036			
i: 870,	target: -0.0702,	output: -0.0533,	loss:
0.2412			
i: 871,	target: -0.0121,	output: -0.0211,	loss:
0.7386			
i: 872,	target: -0.0959,	output: -0.0613,	loss:

0.3613			
i: 873,	target: 0.1595,	output: 0.0940,	loss:
0.4109			
i: 874,	target: -0.0861,	output: -0.0624,	loss:
0.2757			
i: 875,	target: 0.2371,	output: 0.1167,	loss:
0.5078			
i: 876,	target: -0.0870,	output: -0.0520,	loss:
0.4022			
i: 877,	target: -0.0684,	output: -0.0777,	loss:
0.1361			
i: 878,	target: 0.2938,	output: 0.2076,	loss:
0.2933			
i: 879,	target: -0.0805,	output: -0.0628,	loss:
0.2193			
i: 880,	target: -0.0397,	output: -0.0670,	loss:
0.6872			
i: 881,	target: -0.0661,	output: -0.0314,	loss:
0.5243			
i: 882,	target: -0.0520,	output: -0.0526,	loss:
0.0123			
i: 883,	target: 0.1947,	output: 0.1469,	loss:
0.2456			
i: 884,	target: -0.0699,	output: -0.0455,	loss:
0.3484			
i: 885,	target: 0.1428,	output: 0.1641,	loss:
0.1490			
i: 886,	target: -0.0679,	output: -0.0543,	loss:
0.1996			
i: 887,	target: -0.0786,	output: -0.0634,	loss:
0.1928			
i: 888,	target: 0.2506,	output: 0.2968,	loss:
0.1845			
i: 889,	target: 0.0169,	output: 0.0642,	loss:
2.8047			
i: 890,	target: -0.0483,	output: -0.0678,	loss:
0.4047			
i: 891,	target: -0.0550,	output: -0.0329,	loss:
0.4023			
i: 892,	target: -0.0431,	output: -0.0654,	loss:
0.5171			
i: 893,	target: 0.0033,	output: 0.0597,	loss:
17.1295			
i: 894,	target: -0.0694,	output: -0.0512,	loss:
0.2629			
i: 895,	target: 0.0327,	output: 0.0237,	loss:
0.2751			
i: 896,	target: -0.0487,	output: 0.0198,	loss:

1.4071			
i: 897,	target: 0.1370,	output: 0.0763,	loss:
0.4432			
i: 898,	target: -0.0532,	output: -0.0113,	loss:
0.7869			
i: 899,	target: 0.1813,	output: -0.0729,	loss:
1.4024			
i: 900,	target: -0.0868,	output: -0.0106,	loss:
0.8778			
i: 901,	target: -0.0731,	output: -0.0525,	loss:
0.2820			
i: 902,	target: 0.0408,	output: 0.0463,	loss:
0.1360			
i: 903,	target: -0.0772,	output: -0.0636,	loss:
0.1759			
i: 904,	target: -0.0547,	output: -0.0467,	loss:
0.1454			
i: 905,	target: 0.1944,	output: 0.1172,	loss:
0.3973			
i: 906,	target: -0.0504,	output: -0.0462,	loss:
0.0821			
i: 907,	target: -0.0759,	output: -0.0711,	loss:
0.0636			
i: 908,	target: 0.2640,	output: 0.1861,	loss:
0.2951			
i: 909,	target: 0.1039,	output: 0.1055,	loss:
0.0151			
i: 910,	target: 0.3142,	output: 0.2484,	loss:
0.2092			
i: 911,	target: -0.0935,	output: -0.0391,	loss:
0.5814			
i: 912,	target: 0.2031,	output: 0.1469,	loss:
0.2769			
i: 913,	target: -0.0277,	output: -0.0682,	loss:
1.4617			
i: 914,	target: -0.0681,	output: -0.0686,	loss:
0.0076			
i: 915,	target: 0.1971,	output: 0.0755,	loss:
0.6170			
i: 916,	target: 0.1954,	output: 0.1681,	loss:
0.1396			
i: 917,	target: 0.0113,	output: 0.0274,	loss:
1.4166			
i: 918,	target: -0.0994,	output: -0.0620,	loss:
0.3761			
i: 919,	target: -0.0729,	output: -0.0408,	loss:
0.4401			
i: 920,	target: 0.0975,	output: 0.0825,	loss:



0.1547			
i: 921,	target: -0.0699,	output: -0.0201,	loss:
0.7129			
i: 922,	target: -0.0748,	output: -0.0434,	loss:
0.4203			
i: 923,	target: 0.1384,	output: 0.1320,	loss:
0.0461			
i: 924,	target: 0.1990,	output: 0.1137,	loss:
0.4288			
i: 925,	target: 0.0965,	output: 0.0452,	loss:
0.5319			
i: 926,	target: 0.0724,	output: 0.1065,	loss:
0.4716			
i: 927,	target: 0.1860,	output: 0.1386,	loss:
0.2548			
i: 928,	target: 0.1316,	output: 0.1063,	loss:
0.1923			
i: 929,	target: -0.0676,	output: -0.0506,	loss:
0.2519			
i: 930,	target: -0.0132,	output: -0.0099,	loss:
0.2544			
i: 931,	target: -0.1046,	output: -0.0594,	loss:
0.4320			
i: 932,	target: -0.0856,	output: -0.0562,	loss:
0.3439			
i: 933,	target: -0.0575,	output: -0.0497,	loss:
0.1367			
i: 934,	target: -0.0722,	output: -0.0683,	loss:
0.0542			
i: 935,	target: 0.1610,	output: 0.1418,	loss:
0.1188			
i: 936,	target: -0.0487,	output: -0.0723,	loss:
0.4837			
i: 937,	target: -0.0784,	output: -0.0713,	loss:
0.0907			
i: 938,	target: 0.2034,	output: 0.0998,	loss:
0.5091			
i: 939,	target: -0.0592,	output: -0.0550,	loss:
0.0700			
i: 940,	target: -0.0088,	output: -0.0533,	loss:
5.0910			
i: 941,	target: -0.0622,	output: -0.0458,	loss:
0.2638			
i: 942,	target: 0.1122,	output: 0.1493,	loss:
0.3303			
i: 943,	target: -0.0327,	output: -0.0323,	loss:
0.0145			
i: 944,	target: 0.0243,	output: 0.0172,	loss:

0.2901			
i: 945,	target: -0.0688,	output: -0.0321,	loss:
0.5340			
i: 946,	target: 0.1128,	output: 0.0309,	loss:
0.7261			
i: 947,	target: 0.1483,	output: 0.0894,	loss:
0.3969			
i: 948,	target: 0.0042,	output: 0.0271,	loss:
5.3934			
i: 949,	target: 0.0425,	output: 0.0303,	loss:
0.2861			
i: 950,	target: 0.1964,	output: 0.1862,	loss:
0.0523			
i: 951,	target: 0.2108,	output: 0.1754,	loss:
0.1680			
i: 952,	target: 0.2015,	output: 0.1652,	loss:
0.1803			
i: 953,	target: 0.2166,	output: 0.1361,	loss:
0.3719			
i: 954,	target: -0.0765,	output: -0.0147,	loss:
0.8073			
i: 955,	target: 0.1043,	output: 0.1293,	loss:
0.2405			
i: 956,	target: 0.0896,	output: 0.1470,	loss:
0.6395			
i: 957,	target: 0.0283,	output: -0.0031,	loss:
1.1108			
i: 958,	target: -0.0697,	output: -0.0450,	loss:
0.3546			
i: 959,	target: -0.0759,	output: -0.0762,	loss:
0.0037			
i: 960,	target: 0.2267,	output: 0.1667,	loss:
0.2644			
i: 961,	target: -0.0722,	output: -0.0636,	loss:
0.1183			
i: 962,	target: -0.0734,	output: -0.0750,	loss:
0.0215			
i: 963,	target: -0.0355,	output: -0.0602,	loss:
0.6957			
i: 964,	target: -0.0709,	output: -0.0619,	loss:
0.1265			
i: 965,	target: -0.0842,	output: -0.0749,	loss:
0.1098			
i: 966,	target: 0.1975,	output: 0.1306,	loss:
0.3384			
i: 967,	target: -0.0750,	output: -0.0529,	loss:
0.2947			
i: 968,	target: -0.0868,	output: -0.0530,	loss:

0.3896			
i: 969,	target: 0.1769,	output: 0.1645,	loss:
0.0701			
i: 970,	target: 0.0017,	output: 0.0444,	loss:
25.1878			
i: 971,	target: 0.0031,	output: 0.0289,	loss:
8.3122			
i: 972,	target: 0.1929,	output: 0.1751,	loss:
0.0925			
i: 973,	target: -0.0058,	output: 0.0824,	loss:
15.1397			
i: 974,	target: 0.2362,	output: 0.2357,	loss:
0.0020			
i: 975,	target: -0.0656,	output: -0.0395,	loss:
0.3973			
i: 976,	target: -0.0140,	output: -0.0516,	loss:
2.6768			
i: 977,	target: -0.0387,	output: -0.0600,	loss:
0.5525			
i: 978,	target: -0.0675,	output: -0.0587,	loss:
0.1305			
i: 979,	target: 0.1034,	output: 0.0435,	loss:
0.5792			
i: 980,	target: 0.1198,	output: 0.1013,	loss:
0.1543			
i: 981,	target: 0.1734,	output: 0.0951,	loss:
0.4514			
i: 982,	target: 0.2044,	output: 0.2027,	loss:
0.0081			
i: 983,	target: 0.2041,	output: 0.1204,	loss:
0.4102			
i: 984,	target: 0.2361,	output: 0.1784,	loss:
0.2444			
i: 985,	target: -0.0816,	output: -0.0450,	loss:
0.4480			
i: 986,	target: -0.0323,	output: -0.0175,	loss:
0.4593			
i: 987,	target: -0.0788,	output: -0.0692,	loss:
0.1226			
i: 988,	target: 0.1072,	output: 0.0473,	loss:
0.5593			
i: 989,	target: -0.0345,	output: -0.0709,	loss:
1.0568			
i: 990,	target: -0.0413,	output: -0.0715,	loss:
0.7326			
i: 991,	target: -0.0799,	output: -0.0740,	loss:
0.0745			
i: 992,	target: 0.1135,	output: 0.0456,	loss:

```

0.5985
i: 993,          target: 0.2821,          output: 0.2346,          loss:
0.1682
i: 994,          target: 0.1577,          output: 0.1219,          loss:
0.2269
i: 995,          target: -0.0644,          output: -0.0521,          loss:
0.1918
i: 996,          target: 0.0844,          output: 0.0548,          loss:
0.3506
i: 997,          target: 0.1754,          output: 0.1459,          loss:
0.1686
i: 998,          target: -0.0696,          output: -0.0542,          loss:
0.2215
i: 999,          target: -0.0593,          output: -0.0714,          loss:
0.2029
Average loss: 1.2063
Saved in: peptide-QML/checkpoints/0809/txts/0809-sh_em_1qm_v2_validation_1.txt

```

```

[ ]: # push changes to git
if initial_path != '../':
    !cd peptide-QML && git add . && git commit -m "data trained model" && git_
    ↪push

```

```

[main 7b92985e] data trained model
11 files changed, 1041 insertions(+)
create mode 100644 checkpoints/0809/models/0809-sh_em_1qm_v2_1.pth
create mode 100644
checkpoints/0809/plots/0809-sh_em_1qm_v2_losses_batches_1.png
create mode 100644 checkpoints/0809/plots/0809-sh_em_1qm_v2_losses_epoch_1.png
create mode 100644
checkpoints/0809/plots/0809-sh_em_1qm_v2_losses_epoch_validation_1.png
create mode 100644
checkpoints/0809/plots/0809-sh_em_1qm_v2_parameter_0.weight_None_1.png
create mode 100644
checkpoints/0809/plots/0809-sh_em_1qm_v2_parameter_2.block_weights_None_1.png
create mode 100644 checkpoints/0809/plots/0809-
sh_em_1qm_v2_parameter_2.embedding_weights_None_1.png
create mode 100644
checkpoints/0809/plots/0809-sh_em_1qm_v2_parameter_3.bias_None_1.png
create mode 100644
checkpoints/0809/plots/0809-sh_em_1qm_v2_parameter_3.weight_None_1.png
create mode 100644 checkpoints/0809/txts/0809-sh_em_1qm_v2_model_str_1.txt
create mode 100644 checkpoints/0809/txts/0809-sh_em_1qm_v2_validation_1.txt
Enumerating objects: 24, done.
Counting objects: 100% (24/24), done.
Delta compression using up to 24 threads
Compressing objects: 100% (18/18), done.
Writing objects: 100% (18/18), 157.73 KiB | 8.30 MiB/s, done.

```

```
Total 18 (delta 5), reused 0 (delta 0)
remote: Resolving deltas: 100% (5/5), completed with 5 local objects.
To github.com:raulconchello/peptide-QML.git
    ade61ba0..7b92985e  main -> main
```