

0809-sh_em_1qm

August 10, 2023

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

```
[ ]: day = "0809"  
name_notebook = day + "-sh_em_1qm.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()]

```

```

[ ]: # 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([[[[-0.8238,  0.5684,  0.9848, -0.6260,  0.2559],
          [-0.4215,  0.8182,  0.5882, -1.8026,  0.2835],
          [ 0.6519, -0.3350, -0.3410,  2.7414,  0.5304],
          [-0.2755, -0.2300,  0.2801, -0.8748, -0.4537]],

        [[ 0.1543,  0.9686,  0.9260,  0.1245, -0.3903],
          [-0.5318, -1.3164, -1.3797,  0.0325, -1.6024],
          [-1.7658, -1.0104, -0.1229, -1.0015,  0.4856],

```

```

        [ 0.6519, -0.3350, -0.3410,  2.7414,  0.5304]]],
        grad_fn=<EmbeddingBackward>) torch.Size([2, 4, 5])
tensor([[ -0.8238, -0.4215,  0.6519, -0.2755,  0.5684,  0.8182, -0.3350, -0.2300,
          0.9848,  0.5882, -0.3410,  0.2801, -0.6260, -1.8026,  2.7414, -0.8748,
          0.2559,  0.2835,  0.5304, -0.4537],
        [ 0.1543, -0.5318, -1.7658,  0.6519,  0.9686, -1.3164, -1.0104, -0.3350,
          0.9260, -1.3797, -0.1229, -0.3410,  0.1245,  0.0325, -1.0015,  2.7414,
          -0.3903, -1.6024,  0.4856,  0.5304]], grad_fn=<SqueezeBackward0>)
torch.Size([2, 20])
tensor([[ -0.1563],
        [ -0.1094]], 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([[ -0.8238,  0.5684,  0.9848, -0.6260,  0.2559],
        [ -0.4215,  0.8182,  0.5882, -1.8026,  0.2835],
        [ 0.6519, -0.3350, -0.3410,  2.7414,  0.5304],
        [ -0.2755, -0.2300,  0.2801, -0.8748, -0.4537]],
        grad_fn=<EmbeddingBackward>) torch.Size([4, 5])
tensor([[ -0.8238, -0.4215,  0.6519, -0.2755,  0.5684,  0.8182, -0.3350, -0.2300,
          0.9848,  0.5882, -0.3410,  0.2801, -0.6260, -1.8026,  2.7414, -0.8748,
          0.2559,  0.2835,  0.5304, -0.4537], grad_fn=<SqueezeBackward0>)
torch.Size([20])
0 tensor([ -0.1563], grad_fn=<CatBackward>)
tensor([[ 0.1543,  0.9686,  0.9260,  0.1245, -0.3903],
        [ -0.5318, -1.3164, -1.3797,  0.0325, -1.6024],
        [ -1.7658, -1.0104, -0.1229, -1.0015,  0.4856],
        [ 0.6519, -0.3350, -0.3410,  2.7414,  0.5304]],
        grad_fn=<EmbeddingBackward>) torch.Size([4, 5])
tensor([ 0.1543, -0.5318, -1.7658,  0.6519,  0.9686, -1.3164, -1.0104, -0.3350,
          0.9260, -1.3797, -0.1229, -0.3410,  0.1245,  0.0325, -1.0015,  2.7414,
          -0.3903, -1.6024,  0.4856,  0.5304], grad_fn=<SqueezeBackward0>)
torch.Size([20])
1 tensor([ -0.1094], grad_fn=<CatBackward>)

```

```

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

```

```

tensor([[ -0.1563],
        [ -0.1094]], grad_fn=<ViewBackward>)
tensor([ -0.1094], grad_fn=<CatBackward>)

```

```
[ ]: 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: 2.1336, Loss validation: 2.0988

/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: -0.0670, target: 0.1588,
loss: 1.4219

Validation string, i: 1; prediction: 0.1729, target:
-0.0855, loss: 3.0216

Validation string, i: 2; prediction: 0.1161, target: 0.0078,
loss: 13.8053

Epoch [1/50], Loss: 2.1546, Loss validation: 2.2742, Time remaining: ~1.0h 39.0m 38s

Validation string, i: 0; prediction: -0.3210, target: 0.1588,
loss: 3.0223

Validation string, i: 1; prediction: -0.2557, target:
-0.0855, loss: 1.9908

Validation string, i: 2; prediction: -0.4777, target: 0.0078,
loss: 61.8880

Epoch [2/50], Loss: 2.1733, Loss validation: 2.5028, Time remaining: ~1.0h 33.0m 58s

Validation string, i: 0; prediction: 0.0043, target: 0.1588,
loss: 0.9731

Validation string, i: 1; prediction: -0.2925, target:
-0.0855, loss: 2.4210

Validation string, i: 2; prediction: -0.2028, target: 0.0078,
loss: 26.8538

Epoch [3/50], Loss: 2.1925, Loss validation: 2.3773, Time remaining: ~1.0h 30.0m

33s

Validation string, i: 0; prediction: 0.3869, target: 0.1588,
loss: 1.4371

Validation string, i: 1; prediction: -0.0075, target:
-0.0855, loss: 0.9128

Validation string, i: 2; prediction: 0.3955, target: 0.0078,
loss: 49.4114

Epoch [4/50], Loss: 2.1925, Loss validation: 2.0999, Time remaining: ~1.0h 30.0m
60s

Validation string, i: 0; prediction: -0.0722, target: 0.1588,
loss: 1.4549

Validation string, i: 1; prediction: 0.0147, target:
-0.0855, loss: 1.1720

Validation string, i: 2; prediction: 0.3235, target: 0.0078,
loss: 40.2396

Epoch [5/50], Loss: 2.2027, Loss validation: 2.1365, Time remaining: ~1.0h 28.0m
37s

Validation string, i: 0; prediction: -0.1913, target: 0.1588,
loss: 2.2049

Validation string, i: 1; prediction: -0.3063, target:
-0.0855, loss: 2.5825

Validation string, i: 2; prediction: 0.1729, target: 0.0078,
loss: 21.0376

Epoch [6/50], Loss: 2.1829, Loss validation: 2.0869, Time remaining: ~1.0h 26.0m
27s

Validation string, i: 0; prediction: 0.1823, target: 0.1588,
loss: 0.1483

Validation string, i: 1; prediction: 0.3967, target:
-0.0855, loss: 5.6394

Validation string, i: 2; prediction: 0.4088, target: 0.0078,
loss: 51.1094

Epoch [7/50], Loss: 2.2028, Loss validation: 2.4434, Time remaining: ~1.0h 24.0m
21s

Validation string, i: 0; prediction: 0.1143, target: 0.1588,
loss: 0.2798

Validation string, i: 1; prediction: 0.0705, target:
-0.0855, loss: 1.8240

Validation string, i: 2; prediction: 0.1517, target: 0.0078,
loss: 18.3390

Epoch [8/50], Loss: 2.1893, Loss validation: 2.2803, Time remaining: ~1.0h 22.0m
20s

Validation string, i: 0; prediction: -0.1904, target: 0.1588,
loss: 2.1996

Validation string, i: 1; prediction: -0.0737, target:
-0.0855, loss: 0.1386

Validation string, i: 2; prediction: 0.2294, target: 0.0078,
loss: 28.2380

Epoch [9/50], Loss: 2.1969, Loss validation: 2.1731, Time remaining: ~1.0h 20.0m

20s

Validation string,	i: 0;	prediction: -0.3966,	target: 0.1588,
loss: 3.4981			
Validation string,	i: 1;	prediction: -0.3290,	target:
-0.0855, loss: 2.8482			
Validation string,	i: 2;	prediction: -0.1422,	target: 0.0078,
loss: 19.1224			

Epoch [10/50], Loss: 2.1795, Loss validation: 2.3864, Time remaining: ~1.0h
18.0m 22s

Validation string,	i: 0;	prediction: -0.2743,	target: 0.1588,
loss: 2.7281			
Validation string,	i: 1;	prediction: 0.0443,	target:
-0.0855, loss: 1.5176			
Validation string,	i: 2;	prediction: -0.2668,	target: 0.0078,
loss: 35.0086			

Epoch [11/50], Loss: 2.1825, Loss validation: 2.1446, Time remaining: ~1.0h
16.0m 23s

Validation string,	i: 0;	prediction: -0.2623,	target: 0.1588,
loss: 2.6520			
Validation string,	i: 1;	prediction: -0.1797,	target:
-0.0855, loss: 1.1011			
Validation string,	i: 2;	prediction: -0.4964,	target: 0.0078,
loss: 64.2709			

Epoch [12/50], Loss: 2.1701, Loss validation: 2.2096, Time remaining: ~1.0h
14.0m 24s

Validation string,	i: 0;	prediction: 0.0675,	target: 0.1588,
loss: 0.5746			
Validation string,	i: 1;	prediction: 0.6621,	target:
-0.0855, loss: 8.7441			
Validation string,	i: 2;	prediction: 0.2704,	target: 0.0078,
loss: 33.4710			

Epoch [13/50], Loss: 2.1627, Loss validation: 2.4556, Time remaining: ~1.0h
12.0m 27s

Validation string,	i: 0;	prediction: 0.0531,	target: 0.1588,
loss: 0.6658			
Validation string,	i: 1;	prediction: 0.0387,	target:
-0.0855, loss: 1.4523			
Validation string,	i: 2;	prediction: -0.1554,	target: 0.0078,
loss: 20.8031			

Epoch [14/50], Loss: 2.1893, Loss validation: 2.2163, Time remaining: ~1.0h
10.0m 30s

Validation string,	i: 0;	prediction: 0.0216,	target: 0.1588,
loss: 0.8641			
Validation string,	i: 1;	prediction: 0.0816,	target:
-0.0855, loss: 1.9539			
Validation string,	i: 2;	prediction: -0.5263,	target: 0.0078,
loss: 68.0922			

Epoch [15/50], Loss: 2.1858, Loss validation: 2.3029, Time remaining: ~1.0h 8.0m

32s
Validation string, i: 0; prediction: -0.2903, target: 0.1588,
loss: 2.8285
Validation string, i: 1; prediction: -0.0883, target:
-0.0855, loss: 0.0322
Validation string, i: 2; prediction: -0.1123, target: 0.0078,
loss: 15.3099
Epoch [16/50], Loss: 2.1484, Loss validation: 2.2227, Time remaining: ~1.0h 6.0m
36s
Validation string, i: 0; prediction: 0.4156, target: 0.1588,
loss: 1.6176
Validation string, i: 1; prediction: -0.1794, target:
-0.0855, loss: 1.0984
Validation string, i: 2; prediction: 0.1805, target: 0.0078,
loss: 22.0043
Epoch [17/50], Loss: 2.1743, Loss validation: 2.1496, Time remaining: ~1.0h 4.0m
39s
Validation string, i: 0; prediction: -0.0704, target: 0.1588,
loss: 1.4434
Validation string, i: 1; prediction: -0.0670, target:
-0.0855, loss: 0.2165
Validation string, i: 2; prediction: -0.1678, target: 0.0078,
loss: 22.3955
Epoch [18/50], Loss: 2.1827, Loss validation: 2.1554, Time remaining: ~1.0h 2.0m
43s
Validation string, i: 0; prediction: -0.2862, target: 0.1588,
loss: 2.8026
Validation string, i: 1; prediction: -0.2339, target:
-0.0855, loss: 1.7355
Validation string, i: 2; prediction: -0.0797, target: 0.0078,
loss: 11.1547
Epoch [19/50], Loss: 2.1722, Loss validation: 2.3214, Time remaining: ~1.0h 0.0m
45s
Validation string, i: 0; prediction: 0.1942, target: 0.1588,
loss: 0.2233
Validation string, i: 1; prediction: -0.1288, target:
-0.0855, loss: 0.5060
Validation string, i: 2; prediction: 0.0198, target: 0.0078,
loss: 1.5176
Epoch [20/50], Loss: 2.1724, Loss validation: 2.3468, Time remaining: ~0.0h
58.0m 48s
Validation string, i: 0; prediction: -0.2623, target: 0.1588,
loss: 2.6525
Validation string, i: 1; prediction: 0.3612, target:
-0.0855, loss: 5.2244
Validation string, i: 2; prediction: 0.4219, target: 0.0078,
loss: 52.7836
Epoch [21/50], Loss: 2.1624, Loss validation: 2.3927, Time remaining: ~0.0h

56.0m 52s
Validation string, i: 0; prediction: 0.1113, target: 0.1588,
loss: 0.2988
Validation string, i: 1; prediction: -0.2740, target:
-0.0855, loss: 2.2048
Validation string, i: 2; prediction: -0.2220, target: 0.0078,
loss: 29.2988
Epoch [22/50], Loss: 2.1994, Loss validation: 2.2325, Time remaining: ~0.0h
54.0m 55s
Validation string, i: 0; prediction: -0.0724, target: 0.1588,
loss: 1.4561
Validation string, i: 1; prediction: 0.1074, target:
-0.0855, loss: 2.2561
Validation string, i: 2; prediction: 0.1613, target: 0.0078,
loss: 19.5550
Epoch [23/50], Loss: 2.1936, Loss validation: 2.3056, Time remaining: ~0.0h
52.0m 58s
Validation string, i: 0; prediction: -0.5777, target: 0.1588,
loss: 4.6392
Validation string, i: 1; prediction: -0.1278, target:
-0.0855, loss: 0.4942
Validation string, i: 2; prediction: 0.3577, target: 0.0078,
loss: 44.5897
Epoch [24/50], Loss: 2.1924, Loss validation: 2.3949, Time remaining: ~0.0h
51.0m 1s
Validation string, i: 0; prediction: -0.0542, target: 0.1588,
loss: 1.3413
Validation string, i: 1; prediction: 0.2643, target:
-0.0855, loss: 4.0908
Validation string, i: 2; prediction: 0.1339, target: 0.0078,
loss: 16.0619
Epoch [25/50], Loss: 2.1781, Loss validation: 2.1592, Time remaining: ~0.0h
49.0m 4s
Validation string, i: 0; prediction: -0.4769, target: 0.1588,
loss: 4.0041
Validation string, i: 1; prediction: 0.0589, target:
-0.0855, loss: 1.6892
Validation string, i: 2; prediction: -0.2872, target: 0.0078,
loss: 37.6034
Epoch [26/50], Loss: 2.1881, Loss validation: 1.9961, Time remaining: ~0.0h
47.0m 7s
Validation string, i: 0; prediction: -0.1392, target: 0.1588,
loss: 1.8771
Validation string, i: 1; prediction: 0.0766, target:
-0.0855, loss: 1.8953
Validation string, i: 2; prediction: 0.5540, target: 0.0078,
loss: 69.6189
Epoch [27/50], Loss: 2.1564, Loss validation: 2.4106, Time remaining: ~0.0h

45.0m 10s
Validation string, i: 0; prediction: 0.0501, target: 0.1588,
loss: 0.6841
Validation string, i: 1; prediction: 0.1892, target:
-0.0855, loss: 3.2123
Validation string, i: 2; prediction: 0.0033, target: 0.0078,
loss: 0.5777
Epoch [28/50], Loss: 2.1931, Loss validation: 2.2749, Time remaining: ~0.0h
43.0m 13s
Validation string, i: 0; prediction: 0.2517, target: 0.1588,
loss: 0.5852
Validation string, i: 1; prediction: -0.0257, target:
-0.0855, loss: 0.6993
Validation string, i: 2; prediction: -0.3455, target: 0.0078,
loss: 45.0423
Epoch [29/50], Loss: 2.1849, Loss validation: 2.3181, Time remaining: ~0.0h
41.0m 16s
Validation string, i: 0; prediction: 0.2808, target: 0.1588,
loss: 0.7688
Validation string, i: 1; prediction: -0.2733, target:
-0.0855, loss: 2.1960
Validation string, i: 2; prediction: -0.0964, target: 0.0078,
loss: 13.2843
Epoch [30/50], Loss: 2.1931, Loss validation: 2.2826, Time remaining: ~0.0h
39.0m 19s
Validation string, i: 0; prediction: 0.1588, target: 0.1588,
loss: 0.0005
Validation string, i: 1; prediction: -0.2024, target:
-0.0855, loss: 1.3674
Validation string, i: 2; prediction: -0.4759, target: 0.0078,
loss: 61.6635
Epoch [31/50], Loss: 2.1979, Loss validation: 2.5433, Time remaining: ~0.0h
37.0m 22s
Validation string, i: 0; prediction: 0.0242, target: 0.1588,
loss: 0.8476
Validation string, i: 1; prediction: 0.1885, target:
-0.0855, loss: 3.2045
Validation string, i: 2; prediction: -0.2687, target: 0.0078,
loss: 35.2481
Epoch [32/50], Loss: 2.1802, Loss validation: 2.3951, Time remaining: ~0.0h
35.0m 25s
Validation string, i: 0; prediction: -0.4285, target: 0.1588,
loss: 3.6994
Validation string, i: 1; prediction: 0.1827, target:
-0.0855, loss: 3.1367
Validation string, i: 2; prediction: 0.2311, target: 0.0078,
loss: 28.4519
Epoch [33/50], Loss: 2.1925, Loss validation: 2.2904, Time remaining: ~0.0h

33.0m 27s
 Validation string, i: 0; prediction: 0.0521, target: 0.1588,
 loss: 0.6716
 Validation string, i: 1; prediction: -0.0186, target:
 -0.0855, loss: 0.7822
 Validation string, i: 2; prediction: 0.0923, target: 0.0078,
 loss: 10.7679
 Epoch [34/50], Loss: 2.1570, Loss validation: 2.1959, Time remaining: ~0.0h
 31.0m 30s
 Validation string, i: 0; prediction: -0.4839, target: 0.1588,
 loss: 4.0483
 Validation string, i: 1; prediction: -0.0408, target:
 -0.0855, loss: 0.5224
 Validation string, i: 2; prediction: 0.2972, target: 0.0078,
 loss: 36.8818
 Epoch [35/50], Loss: 2.1629, Loss validation: 2.3430, Time remaining: ~0.0h
 29.0m 32s
 Validation string, i: 0; prediction: 0.1430, target: 0.1588,
 loss: 0.0993
 Validation string, i: 1; prediction: 0.1022, target:
 -0.0855, loss: 2.1948
 Validation string, i: 2; prediction: 0.0773, target: 0.0078,
 loss: 8.8503
 Epoch [36/50], Loss: 2.1542, Loss validation: 2.3694, Time remaining: ~0.0h
 27.0m 35s
 Validation string, i: 0; prediction: -0.2353, target: 0.1588,
 loss: 2.4820
 Validation string, i: 1; prediction: -0.0119, target:
 -0.0855, loss: 0.8611
 Validation string, i: 2; prediction: 0.2180, target: 0.0078,
 loss: 26.7857
 Epoch [37/50], Loss: 2.1460, Loss validation: 2.6941, Time remaining: ~0.0h
 25.0m 37s
 Validation string, i: 0; prediction: 0.1109, target: 0.1588,
 loss: 0.3015
 Validation string, i: 1; prediction: 0.4275, target:
 -0.0855, loss: 5.9997
 Validation string, i: 2; prediction: 0.3736, target: 0.0078,
 loss: 46.6278
 Epoch [38/50], Loss: 2.1749, Loss validation: 2.2049, Time remaining: ~0.0h
 23.0m 39s
 Validation string, i: 0; prediction: 0.3589, target: 0.1588,
 loss: 1.2607
 Validation string, i: 1; prediction: -0.1777, target:
 -0.0855, loss: 1.0779
 Validation string, i: 2; prediction: 0.0470, target: 0.0078,
 loss: 4.9883
 Epoch [39/50], Loss: 2.1711, Loss validation: 2.1389, Time remaining: ~0.0h

21.0m 42s
 Validation string, i: 0; prediction: 0.2718, target: 0.1588,
 loss: 0.7119
 Validation string, i: 1; prediction: 0.2419, target:
 -0.0855, loss: 3.8290
 Validation string, i: 2; prediction: 0.1530, target: 0.0078,
 loss: 18.5012
 Epoch [40/50], Loss: 2.1424, Loss validation: 2.3757, Time remaining: ~0.0h
 19.0m 44s
 Validation string, i: 0; prediction: 0.0867, target: 0.1588,
 loss: 0.4538
 Validation string, i: 1; prediction: 0.1180, target:
 -0.0855, loss: 2.3796
 Validation string, i: 2; prediction: -0.1135, target: 0.0078,
 loss: 15.4723
 Epoch [41/50], Loss: 2.1501, Loss validation: 2.2002, Time remaining: ~0.0h
 17.0m 46s
 Validation string, i: 0; prediction: 0.0199, target: 0.1588,
 loss: 0.8743
 Validation string, i: 1; prediction: 0.1329, target:
 -0.0855, loss: 2.5549
 Validation string, i: 2; prediction: -0.1010, target: 0.0078,
 loss: 13.8704
 Epoch [42/50], Loss: 2.1691, Loss validation: 2.5804, Time remaining: ~0.0h
 15.0m 48s
 Validation string, i: 0; prediction: 0.3630, target: 0.1588,
 loss: 1.2868
 Validation string, i: 1; prediction: -0.4283, target:
 -0.0855, loss: 4.0093
 Validation string, i: 2; prediction: -0.0452, target: 0.0078,
 loss: 6.7577
 Epoch [43/50], Loss: 2.1501, Loss validation: 2.1907, Time remaining: ~0.0h
 13.0m 49s
 Validation string, i: 0; prediction: -0.4561, target: 0.1588,
 loss: 3.8733
 Validation string, i: 1; prediction: -0.0390, target:
 -0.0855, loss: 0.5442
 Validation string, i: 2; prediction: 0.3287, target: 0.0078,
 loss: 40.8988
 Epoch [44/50], Loss: 2.1784, Loss validation: 2.1446, Time remaining: ~0.0h
 11.0m 51s
 Validation string, i: 0; prediction: -0.0066, target: 0.1588,
 loss: 1.0418
 Validation string, i: 1; prediction: -0.5131, target:
 -0.0855, loss: 5.0013
 Validation string, i: 2; prediction: 0.0016, target: 0.0078,
 loss: 0.7956
 Epoch [45/50], Loss: 2.1927, Loss validation: 2.0506, Time remaining: ~0.0h 9.0m

```

53s
    Validation string,      i: 0;  prediction: 0.2840,      target: 0.1588,
loss: 0.7890
    Validation string,      i: 1;  prediction: 0.0561,      target:
-0.0855,      loss: 1.6559
    Validation string,      i: 2;  prediction: 0.1060,      target: 0.0078,
loss: 12.5106
Epoch [46/50], Loss: 2.1697, Loss validation: 2.3021, Time remaining: ~0.0h 7.0m
54s
    Validation string,      i: 0;  prediction: 0.2221,      target: 0.1588,
loss: 0.3989
    Validation string,      i: 1;  prediction: -0.1467,      target:
-0.0855,      loss: 0.7161
    Validation string,      i: 2;  prediction: -0.0109,      target: 0.0078,
loss: 2.3945
Epoch [47/50], Loss: 2.1631, Loss validation: 2.3202, Time remaining: ~0.0h 5.0m
56s
    Validation string,      i: 0;  prediction: -0.0888,      target: 0.1588,
loss: 1.5595
    Validation string,      i: 1;  prediction: 0.2249,      target:
-0.0855,      loss: 3.6307
    Validation string,      i: 2;  prediction: -0.1382,      target: 0.0078,
loss: 18.6192
Epoch [48/50], Loss: 2.1550, Loss validation: 2.4137, Time remaining: ~0.0h 3.0m
57s
    Validation string,      i: 0;  prediction: -0.0464,      target: 0.1588,
loss: 1.2922
    Validation string,      i: 1;  prediction: -0.2532,      target:
-0.0855,      loss: 1.9617
    Validation string,      i: 2;  prediction: -0.2404,      target: 0.0078,
loss: 31.6473
Epoch [49/50], Loss: 2.1883, Loss validation: 2.3770, Time remaining: ~0.0h 1.0m
59s
    Validation string,      i: 0;  prediction: 0.1896,      target: 0.1588,
loss: 0.1944
    Validation string,      i: 1;  prediction: -0.1421,      target:
-0.0855,      loss: 0.6614
    Validation string,      i: 2;  prediction: -0.4047,      target: 0.0078,
loss: 52.5827
Epoch [50/50], Loss: 2.1767, Loss validation: 2.0925, Time remaining: ~0.0h 0.0m
0s

```

```

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

```

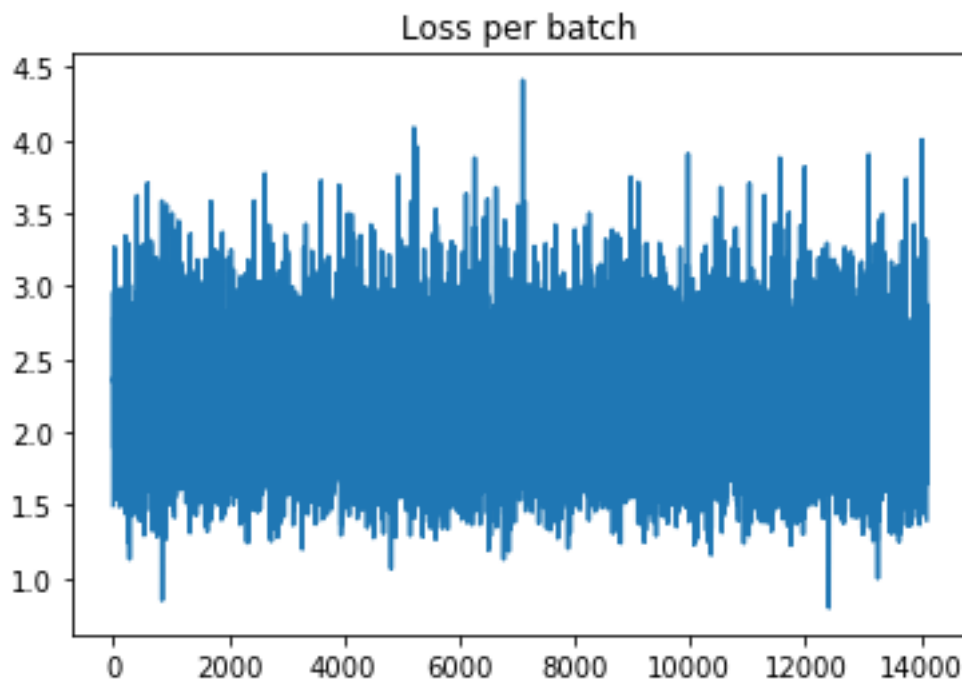
```
)
```

Saved in: peptide-QML/checkpoints/0809/txts/0809-sh_em_1qm_model_str_1.txt

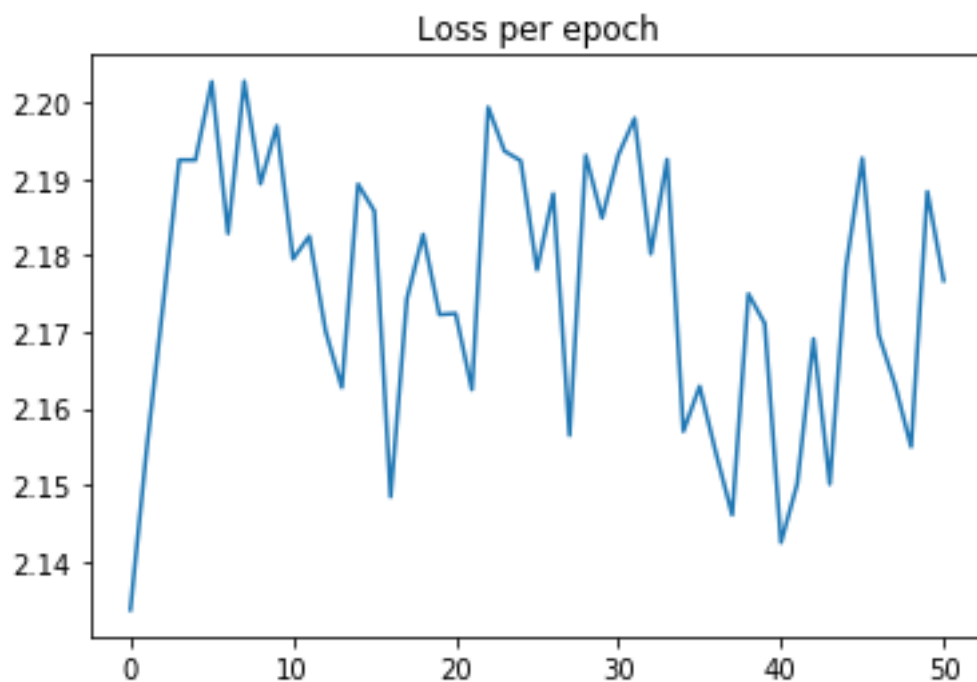
```
[ ]: # plot the losses of the trainig loop and save the figures  
model.plot_losses(save=True)
```

Saved in: peptide-

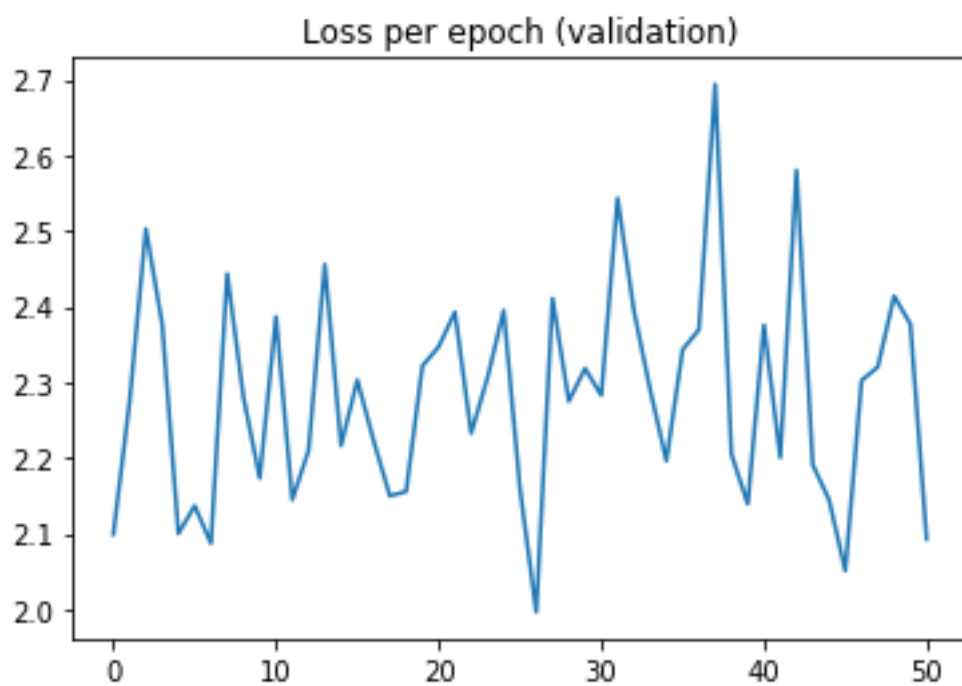
QML/checkpoints/0809/plots/0809-sh_em_1qm_losses_batches_1.png



Saved in: peptide-QML/checkpoints/0809/plots/0809-sh_em_1qm_losses_epoch_1.png



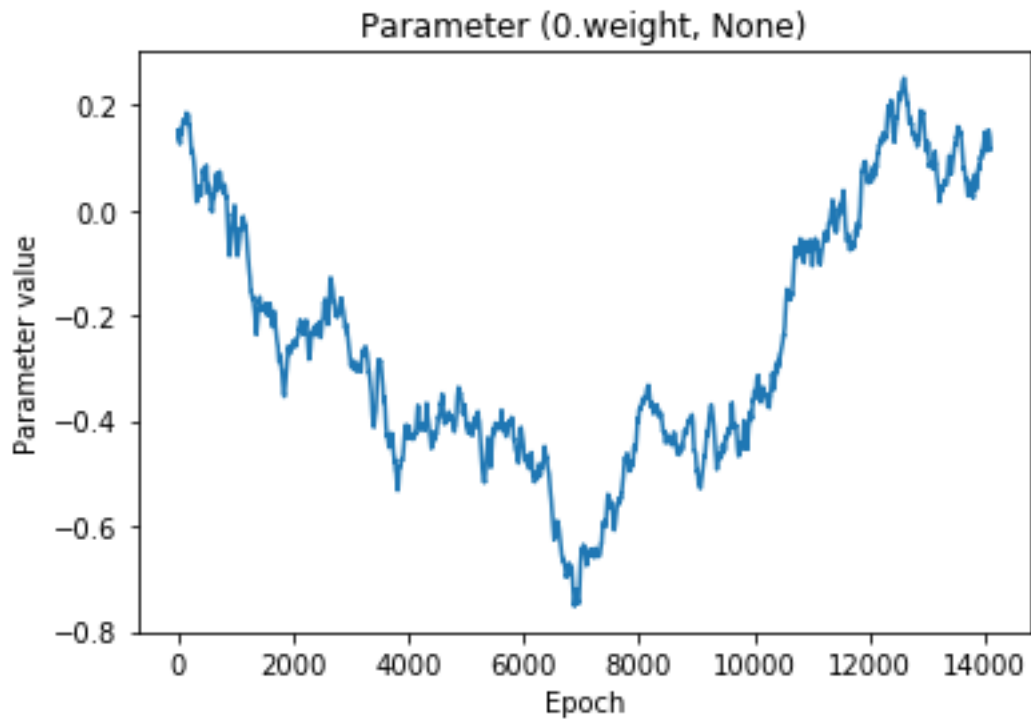
Saved in: peptide-
QML/checkpoints/0809/plots/0809-sh_em_1qm_losses_epoch_validation_1.png



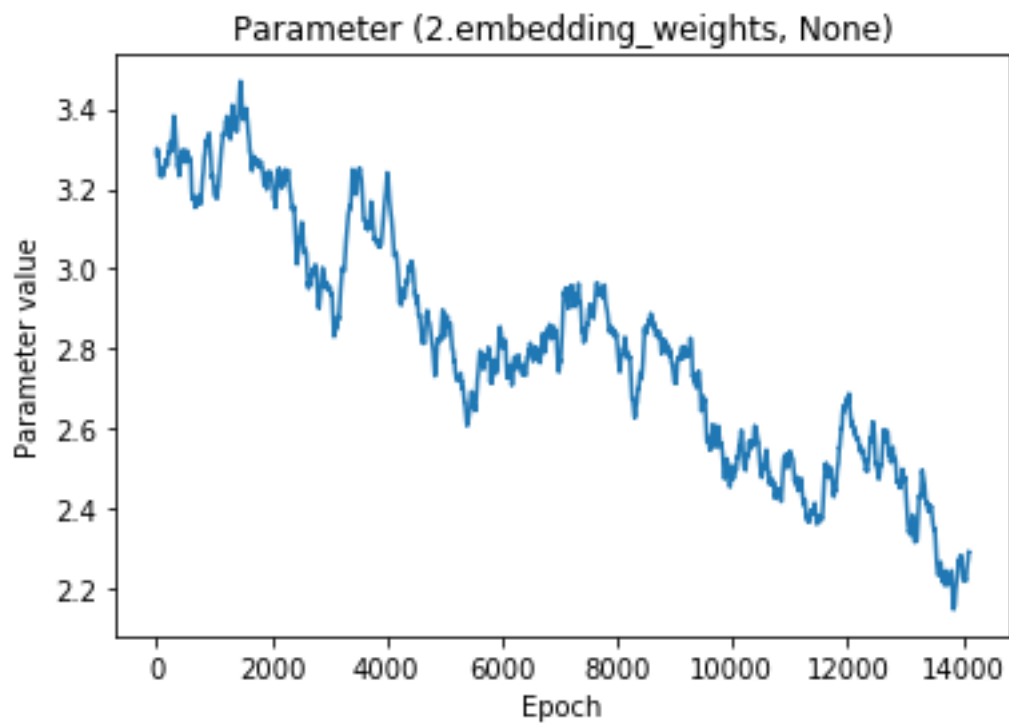

```
[ ]: # plot how the average of the parameters in each layer changes over time, and
      ↪ save that
for layer in model.model.state_dict().keys():
    model.plot_parameter(layer=layer, save=True)
```

Saved in: peptide-

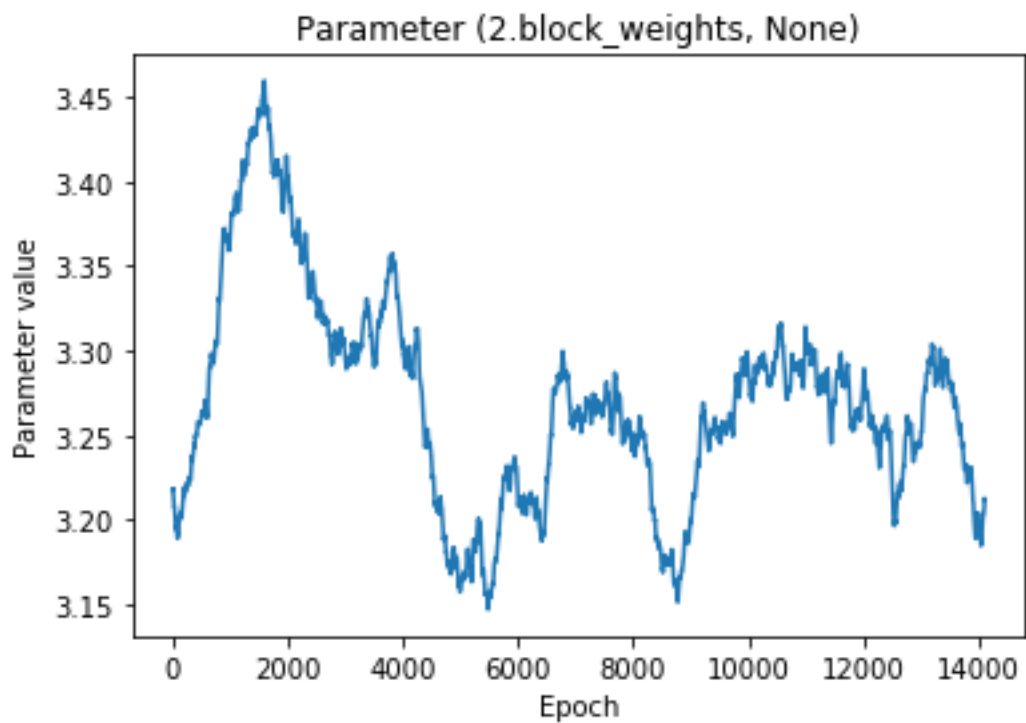
QML/checkpoints/0809/plots/0809-sh_em_1qm_parameter_0.weight_None_1.png



Saved in: peptide-QML/checkpoints/0809/plots/0809-sh_em_1qm_parameter_2.embedding_weights_None_1.png



Saved in: peptide-
QML/checkpoints/0809/plots/0809-sh_em_1qm_parameter_2.block_weights_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_1.pth

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

i: 0,	target: 0.1588,	output: 0.1896,	loss: 0.1944
i: 1,	target: 0.0492,	output: -0.3281,	loss: 7.6695
i: 2,	target: -0.0819,	output: -0.2308,	loss: 1.8177
i: 3,	target: 0.1917,	output: -0.3459,	loss: 2.8040
i: 4,	target: 0.4129,	output: -0.1002,	loss: 1.2427
i: 5,	target: -0.0587,	output: 0.1137,	loss: 2.9379
i: 6,	target: -0.0670,	output: 0.2315,	loss: 4.4538
i: 7,	target: -0.0643,	output: 0.0880,	loss: 2.3698
i: 8,	target: -0.0847,	output: 0.4757,	loss: 6.6138
i: 9,	target: -0.0488,	output: 0.1663,	loss: 4.4075
i: 10,	target: -0.0855,	output: -0.1421,	loss: 0.6614
i: 11,	target: -0.1181,	output: -0.3954,	loss: 2.3472
i: 12,	target: -0.0801,	output: -0.0632,	loss: 0.2101
i: 13,	target: 0.1952,	output: -0.4091,	loss: 3.0958
i: 14,	target: 0.1920,	output: 0.0077,	loss: 0.9601
i: 15,	target: -0.0671,	output: -0.1054,	loss: 0.5708
i: 16,	target: -0.0621,	output: -0.1320,	loss: 1.1253
i: 17,	target: -0.0512,	output: -0.0071,	loss: 0.8623
i: 18,	target: -0.0358,	output: 0.1427,	loss: 4.9877
i: 19,	target: -0.1039,	output: -0.1828,	loss: 0.7599
i: 20,	target: 0.0078,	output: -0.4047,	loss: 52.5827
i: 21,	target: -0.0557,	output: -0.0656,	loss: 0.1790
i: 22,	target: -0.0619,	output: -0.3229,	loss: 4.2141
i: 23,	target: 0.1826,	output: 0.4429,	loss: 1.4256
i: 24,	target: 0.0911,	output: -0.4428,	loss: 5.8598
i: 25,	target: -0.0756,	output: 0.1155,	loss: 2.5274
i: 26,	target: -0.0401,	output: -0.5566,	loss: 12.8957
i: 27,	target: 0.0235,	output: 0.2205,	loss: 8.3847
i: 28,	target: 0.0309,	output: 0.0107,	loss: 0.6544
i: 29,	target: -0.0621,	output: -0.2593,	loss: 3.1764
i: 30,	target: 0.2531,	output: 0.3470,	loss: 0.3711
i: 31,	target: -0.0755,	output: 0.0946,	loss: 2.2542
i: 32,	target: -0.0802,	output: 0.2108,	loss: 3.6270
i: 33,	target: 0.1280,	output: 0.1833,	loss: 0.4317
i: 34,	target: -0.0768,	output: 0.2127,	loss: 3.7704

i: 35,	target: 0.1418,	output: -0.5139,	loss: 4.6250
i: 36,	target: 0.1350,	output: 0.4294,	loss: 2.1803
i: 37,	target: -0.1078,	output: -0.0299,	loss: 0.7222
i: 38,	target: -0.0405,	output: -0.4028,	loss: 8.9537
i: 39,	target: -0.0690,	output: -0.0503,	loss: 0.2709
i: 40,	target: 0.0822,	output: -0.5266,	loss: 7.4081
i: 41,	target: 0.2001,	output: -0.1177,	loss: 1.5883
i: 42,	target: 0.0378,	output: -0.1359,	loss: 4.5930
i: 43,	target: -0.0811,	output: -0.1291,	loss: 0.5927
i: 44,	target: -0.0691,	output: 0.1403,	loss: 3.0299
i: 45,	target: -0.0744,	output: 0.2156,	loss: 3.8967
i: 46,	target: -0.0311,	output: 0.4480,	loss: 15.4190
i: 47,	target: 0.1935,	output: -0.0297,	loss: 1.1537
i: 48,	target: -0.0467,	output: -0.1297,	loss: 1.7763
i: 49,	target: -0.0438,	output: -0.4857,	loss: 10.0762
i: 50,	target: -0.0619,	output: -0.0298,	loss: 0.5188
i: 51,	target: -0.0661,	output: 0.2014,	loss: 4.0474
i: 52,	target: -0.0484,	output: 0.1865,	loss: 4.8490
i: 53,	target: -0.0796,	output: -0.0838,	loss: 0.0523
i: 54,	target: -0.0793,	output: 0.0398,	loss: 1.5025
i: 55,	target: -0.0447,	output: -0.1099,	loss: 1.4581
i: 56,	target: -0.0805,	output: -0.0898,	loss: 0.1154
i: 57,	target: 0.1008,	output: -0.2261,	loss: 3.2440
i: 58,	target: -0.0609,	output: 0.2318,	loss: 4.8050
i: 59,	target: 0.2474,	output: 0.0071,	loss: 0.9712
i: 60,	target: -0.0820,	output: 0.2106,	loss: 3.5698
i: 61,	target: 0.1958,	output: 0.0909,	loss: 0.5359
i: 62,	target: -0.0831,	output: -0.3028,	loss: 2.6423
i: 63,	target: 0.1418,	output: -0.1749,	loss: 2.2330
i: 64,	target: -0.0223,	output: 0.0249,	loss: 2.1162
i: 65,	target: 0.1879,	output: 0.0430,	loss: 0.7710
i: 66,	target: 0.2233,	output: -0.1095,	loss: 1.4905
i: 67,	target: -0.0662,	output: -0.4512,	loss: 5.8152
i: 68,	target: 0.0295,	output: 0.1634,	loss: 4.5307
i: 69,	target: 0.2922,	output: 0.1926,	loss: 0.3409
i: 70,	target: -0.0326,	output: 0.1280,	loss: 4.9244
i: 71,	target: 0.0852,	output: -0.0323,	loss: 1.3786
i: 72,	target: 0.2128,	output: -0.0675,	loss: 1.3169
i: 73,	target: -0.0651,	output: -0.0843,	loss: 0.2946
i: 74,	target: -0.0482,	output: -0.0900,	loss: 0.8676
i: 75,	target: -0.0601,	output: -0.1069,	loss: 0.7787
i: 76,	target: 0.1634,	output: -0.2971,	loss: 2.8175
i: 77,	target: -0.0635,	output: -0.0842,	loss: 0.3245
i: 78,	target: -0.0671,	output: 0.1573,	loss: 3.3432
i: 79,	target: -0.0623,	output: 0.1056,	loss: 2.6939
i: 80,	target: 0.0435,	output: 0.0245,	loss: 0.4369
i: 81,	target: 0.1349,	output: 0.0279,	loss: 0.7931
i: 82,	target: -0.0825,	output: 0.2070,	loss: 3.5085

i: 83,	target: -0.0586,	output: 0.0816,	loss: 2.3921
i: 84,	target: 0.0276,	output: -0.3408,	loss: 13.3341
i: 85,	target: -0.0150,	output: 0.0611,	loss: 5.0826
i: 86,	target: 0.0697,	output: 0.3619,	loss: 4.1919
i: 87,	target: -0.0175,	output: 0.0404,	loss: 3.3101
i: 88,	target: 0.1073,	output: -0.3335,	loss: 4.1090
i: 89,	target: -0.0739,	output: -0.3284,	loss: 3.4431
i: 90,	target: -0.0467,	output: -0.2376,	loss: 4.0904
i: 91,	target: -0.0200,	output: 0.4136,	loss: 21.6805
i: 92,	target: -0.0733,	output: 0.0842,	loss: 2.1487
i: 93,	target: 0.0102,	output: -0.0703,	loss: 7.8896
i: 94,	target: -0.0798,	output: -0.2536,	loss: 2.1776
i: 95,	target: 0.4324,	output: -0.2102,	loss: 1.4861
i: 96,	target: 0.1499,	output: 0.1123,	loss: 0.2504
i: 97,	target: 0.1422,	output: -0.3865,	loss: 3.7178
i: 98,	target: 0.1744,	output: -0.1139,	loss: 1.6532
i: 99,	target: 0.2537,	output: -0.1869,	loss: 1.7368
i: 100,	target: 0.1523,	output: 0.0982,	loss:
0.3553			
i: 101,	target: -0.0671,	output: -0.4970,	loss:
6.4127			
i: 102,	target: 0.2240,	output: -0.2262,	loss:
2.0097			
i: 103,	target: -0.0799,	output: -0.1820,	loss:
1.2774			
i: 104,	target: 0.1174,	output: 0.1668,	loss:
0.4211			
i: 105,	target: 0.2474,	output: -0.1250,	loss:
1.5054			
i: 106,	target: 0.3277,	output: -0.1896,	loss:
1.5785			
i: 107,	target: 0.0854,	output: 0.1141,	loss:
0.3356			
i: 108,	target: 0.4632,	output: 0.0209,	loss:
0.9548			
i: 109,	target: 0.1704,	output: 0.2076,	loss:
0.2184			
i: 110,	target: -0.0952,	output: 0.0418,	loss:
1.4390			
i: 111,	target: 0.4889,	output: -0.0688,	loss:
1.1407			
i: 112,	target: 0.1268,	output: -0.0494,	loss:
1.3898			
i: 113,	target: 0.2305,	output: 0.0234,	loss:
0.8984			
i: 114,	target: -0.0799,	output: 0.3288,	loss:
5.1138			
i: 115,	target: 0.1769,	output: -0.1506,	loss:

1.8510			
i: 116,	target: 0.1352,	output: -0.2967,	loss:
3.1944			
i: 117,	target: 0.1752,	output: 0.2285,	loss:
0.3046			
i: 118,	target: 0.1334,	output: -0.2532,	loss:
2.8985			
i: 119,	target: 0.1926,	output: 0.0194,	loss:
0.8993			
i: 120,	target: -0.0659,	output: -0.0524,	loss:
0.2043			
i: 121,	target: -0.0917,	output: -0.2954,	loss:
2.2218			
i: 122,	target: 0.2459,	output: 0.1590,	loss:
0.3534			
i: 123,	target: 0.2316,	output: -0.1203,	loss:
1.5196			
i: 124,	target: 0.0648,	output: 0.0540,	loss:
0.1659			
i: 125,	target: 0.0294,	output: 0.2545,	loss:
7.6461			
i: 126,	target: -0.0951,	output: 0.0388,	loss:
1.4086			
i: 127,	target: 0.1146,	output: 0.0494,	loss:
0.5692			
i: 128,	target: -0.0910,	output: 0.3367,	loss:
4.6991			
i: 129,	target: 0.0518,	output: -0.1737,	loss:
4.3514			
i: 130,	target: 0.0069,	output: 0.2444,	loss:
34.4190			
i: 131,	target: -0.0669,	output: -0.4758,	loss:
6.1099			
i: 132,	target: -0.0221,	output: -0.2255,	loss:
9.2040			
i: 133,	target: 0.0857,	output: -0.3143,	loss:
4.6653			
i: 134,	target: -0.0630,	output: -0.1125,	loss:
0.7851			
i: 135,	target: 0.3213,	output: -0.1301,	loss:
1.4050			
i: 136,	target: 0.0506,	output: 0.2153,	loss:
3.2514			
i: 137,	target: 0.1840,	output: -0.3774,	loss:
3.0514			
i: 138,	target: -0.0587,	output: 0.1863,	loss:
4.1752			
i: 139,	target: -0.0315,	output: -0.1981,	loss:

5.2948			
i: 140,	target: -0.0611,	output: 0.2014,	loss:
4.2957			
i: 141,	target: -0.0603,	output: 0.3023,	loss:
6.0122			
i: 142,	target: 0.1485,	output: 0.0827,	loss:
0.4427			
i: 143,	target: 0.1641,	output: 0.2745,	loss:
0.6729			
i: 144,	target: -0.0774,	output: -0.0154,	loss:
0.8007			
i: 145,	target: -0.0084,	output: 0.2806,	loss:
34.4615			
i: 146,	target: -0.0763,	output: -0.2781,	loss:
2.6446			
i: 147,	target: 0.4137,	output: 0.1517,	loss:
0.6333			
i: 148,	target: 0.0727,	output: 0.0853,	loss:
0.1743			
i: 149,	target: -0.0735,	output: -0.1103,	loss:
0.5018			
i: 150,	target: 0.0342,	output: -0.1042,	loss:
4.0426			
i: 151,	target: -0.1000,	output: -0.2670,	loss:
1.6690			
i: 152,	target: 0.2197,	output: 0.1348,	loss:
0.3866			
i: 153,	target: 0.1875,	output: -0.3157,	loss:
2.6833			
i: 154,	target: -0.0801,	output: 0.4226,	loss:
6.2766			
i: 155,	target: 0.1110,	output: 0.5557,	loss:
4.0076			
i: 156,	target: -0.0397,	output: -0.2410,	loss:
5.0624			
i: 157,	target: -0.0392,	output: -0.0698,	loss:
0.7831			
i: 158,	target: -0.0454,	output: 0.0592,	loss:
2.3034			
i: 159,	target: 0.1956,	output: 0.2358,	loss:
0.2057			
i: 160,	target: 0.1986,	output: -0.1188,	loss:
1.5985			
i: 161,	target: -0.0596,	output: -0.2137,	loss:
2.5824			
i: 162,	target: 0.1252,	output: -0.0612,	loss:
1.4886			
i: 163,	target: 0.0374,	output: 0.1674,	loss:

3.4761			
i: 164,	target: -0.0497,	output: -0.2938,	loss:
4.9068			
i: 165,	target: 0.1918,	output: -0.0702,	loss:
1.3660			
i: 166,	target: 0.0431,	output: -0.0490,	loss:
2.1375			
i: 167,	target: 0.0971,	output: 0.0051,	loss:
0.9477			
i: 168,	target: -0.0087,	output: -0.0663,	loss:
6.6006			
i: 169,	target: 0.0725,	output: -0.0213,	loss:
1.2944			
i: 170,	target: -0.0678,	output: -0.0737,	loss:
0.0868			
i: 171,	target: -0.0755,	output: -0.3125,	loss:
3.1388			
i: 172,	target: -0.1008,	output: 0.0281,	loss:
1.2791			
i: 173,	target: 0.2387,	output: -0.4353,	loss:
2.8240			
i: 174,	target: -0.0906,	output: -0.0499,	loss:
0.4490			
i: 175,	target: -0.0402,	output: 0.4620,	loss:
12.5036			
i: 176,	target: 0.1433,	output: 0.0514,	loss:
0.6412			
i: 177,	target: 0.0165,	output: -0.2051,	loss:
13.4411			
i: 178,	target: -0.0801,	output: 0.4115,	loss:
6.1387			
i: 179,	target: 0.1937,	output: -0.2164,	loss:
2.1175			
i: 180,	target: -0.0960,	output: 0.4757,	loss:
5.9525			
i: 181,	target: 0.1771,	output: 0.0143,	loss:
0.9191			
i: 182,	target: 0.0891,	output: 0.0011,	loss:
0.9872			
i: 183,	target: -0.0762,	output: 0.1130,	loss:
2.4824			
i: 184,	target: -0.0734,	output: 0.1899,	loss:
3.5876			
i: 185,	target: 0.0956,	output: -0.1667,	loss:
2.7439			
i: 186,	target: -0.0432,	output: 0.0574,	loss:
2.3292			
i: 187,	target: -0.0845,	output: -0.0670,	loss:

0.2070			
i: 188,	target: -0.0717,	output: 0.4411,	loss:
7.1568			
i: 189,	target: -0.0736,	output: 0.1314,	loss:
2.7856			
i: 190,	target: 0.2076,	output: 0.2649,	loss:
0.2760			
i: 191,	target: -0.0809,	output: 0.0960,	loss:
2.1863			
i: 192,	target: -0.0588,	output: 0.1439,	loss:
3.4485			
i: 193,	target: -0.0377,	output: -0.4176,	loss:
10.0906			
i: 194,	target: -0.1019,	output: -0.2013,	loss:
0.9752			
i: 195,	target: -0.0552,	output: 0.0814,	loss:
2.4746			
i: 196,	target: -0.0512,	output: 0.1293,	loss:
3.5239			
i: 197,	target: -0.0723,	output: 0.4373,	loss:
7.0475			
i: 198,	target: -0.0847,	output: -0.0196,	loss:
0.7688			
i: 199,	target: 0.1789,	output: -0.0119,	loss:
1.0663			
i: 200,	target: 0.1143,	output: -0.1334,	loss:
2.1671			
i: 201,	target: -0.0641,	output: 0.0733,	loss:
2.1440			
i: 202,	target: -0.0963,	output: -0.2593,	loss:
1.6934			
i: 203,	target: -0.0699,	output: -0.1191,	loss:
0.7026			
i: 204,	target: 0.1419,	output: -0.0271,	loss:
1.1910			
i: 205,	target: 0.0398,	output: 0.0265,	loss:
0.3343			
i: 206,	target: 0.1423,	output: 0.0589,	loss:
0.5862			
i: 207,	target: 0.1444,	output: -0.3291,	loss:
3.2788			
i: 208,	target: -0.0526,	output: 0.0407,	loss:
1.7731			
i: 209,	target: -0.0896,	output: 0.1673,	loss:
2.8676			
i: 210,	target: -0.0860,	output: -0.2275,	loss:
1.6446			
i: 211,	target: 0.2248,	output: 0.0533,	loss:

0.7630			
i: 212,	target: -0.0403,	output: 0.3527,	loss:
9.7488			
i: 213,	target: -0.0788,	output: 0.2601,	loss:
4.3018			
i: 214,	target: 0.1953,	output: 0.0589,	loss:
0.6982			
i: 215,	target: -0.0864,	output: 0.2248,	loss:
3.6011			
i: 216,	target: 0.2358,	output: 0.1508,	loss:
0.3604			
i: 217,	target: 0.1082,	output: 0.3132,	loss:
1.8935			
i: 218,	target: 0.1119,	output: -0.1423,	loss:
2.2710			
i: 219,	target: -0.0725,	output: 0.1496,	loss:
3.0641			
i: 220,	target: -0.0340,	output: 0.0434,	loss:
2.2758			
i: 221,	target: -0.0871,	output: 0.0356,	loss:
1.4091			
i: 222,	target: -0.0802,	output: 0.0103,	loss:
1.1290			
i: 223,	target: -0.0702,	output: 0.1270,	loss:
2.8082			
i: 224,	target: 0.2406,	output: -0.1537,	loss:
1.6388			
i: 225,	target: 0.0974,	output: 0.0418,	loss:
0.5712			
i: 226,	target: -0.0637,	output: -0.2732,	loss:
3.2888			
i: 227,	target: 0.1167,	output: -0.1651,	loss:
2.4148			
i: 228,	target: 0.1877,	output: -0.4845,	loss:
3.5804			
i: 229,	target: -0.0460,	output: 0.0082,	loss:
1.1786			
i: 230,	target: -0.0369,	output: 0.2384,	loss:
7.4678			
i: 231,	target: -0.0627,	output: 0.4534,	loss:
8.2322			
i: 232,	target: -0.0916,	output: -0.0084,	loss:
0.9083			
i: 233,	target: -0.0826,	output: 0.2060,	loss:
3.4935			
i: 234,	target: 0.3187,	output: 0.1058,	loss:
0.6681			
i: 235,	target: -0.0721,	output: -0.1006,	loss:

0.3950			
i: 236,	target: -0.0582,	output: 0.4788,	loss:
9.2278			
i: 237,	target: -0.0843,	output: -0.0042,	loss:
0.9500			
i: 238,	target: 0.1401,	output: -0.0810,	loss:
1.5782			
i: 239,	target: -0.0253,	output: -0.3180,	loss:
11.5876			
i: 240,	target: 0.0953,	output: 0.0362,	loss:
0.6201			
i: 241,	target: 0.0534,	output: -0.0048,	loss:
1.0901			
i: 242,	target: -0.0316,	output: 0.0823,	loss:
3.6037			
i: 243,	target: 0.1829,	output: 0.2847,	loss:
0.5565			
i: 244,	target: -0.0968,	output: 0.1424,	loss:
2.4709			
i: 245,	target: -0.0733,	output: 0.0842,	loss:
2.1487			
i: 246,	target: -0.0712,	output: -0.1977,	loss:
1.7766			
i: 247,	target: -0.0568,	output: 0.2554,	loss:
5.4925			
i: 248,	target: 0.0930,	output: -0.1266,	loss:
2.3612			
i: 249,	target: -0.0759,	output: 0.0657,	loss:
1.8662			
i: 250,	target: 0.1714,	output: -0.1154,	loss:
1.6732			
i: 251,	target: -0.0876,	output: 0.1079,	loss:
2.2311			
i: 252,	target: -0.0137,	output: 0.2747,	loss:
21.1018			
i: 253,	target: -0.0891,	output: -0.1795,	loss:
1.0133			
i: 254,	target: -0.0389,	output: 0.0998,	loss:
3.5690			
i: 255,	target: 0.0105,	output: -0.2023,	loss:
20.1799			
i: 256,	target: 0.2537,	output: -0.0575,	loss:
1.2266			
i: 257,	target: -0.0568,	output: 0.3778,	loss:
7.6489			
i: 258,	target: -0.0389,	output: -0.0853,	loss:
1.1923			
i: 259,	target: 0.1595,	output: 0.3104,	loss:

0.9459			
i: 260,	target: -0.0845,	output: -0.2302,	loss:
1.7234			
i: 261,	target: -0.0898,	output: 0.3375,	loss:
4.7570			
i: 262,	target: -0.0768,	output: 0.1606,	loss:
3.0902			
i: 263,	target: 0.1702,	output: 0.3138,	loss:
0.8439			
i: 264,	target: 0.1881,	output: 0.2099,	loss:
0.1158			
i: 265,	target: -0.0372,	output: -0.0592,	loss:
0.5927			
i: 266,	target: -0.0567,	output: 0.3256,	loss:
6.7426			
i: 267,	target: -0.0303,	output: -0.2511,	loss:
7.2728			
i: 268,	target: 0.2202,	output: -0.3822,	loss:
2.7362			
i: 269,	target: -0.0633,	output: -0.5032,	loss:
6.9500			
i: 270,	target: -0.0696,	output: -0.0313,	loss:
0.5502			
i: 271,	target: 0.1826,	output: -0.0198,	loss:
1.1086			
i: 272,	target: -0.0712,	output: -0.4296,	loss:
5.0374			
i: 273,	target: -0.0801,	output: 0.0115,	loss:
1.1437			
i: 274,	target: 0.1952,	output: 0.2914,	loss:
0.4930			
i: 275,	target: -0.0518,	output: -0.2273,	loss:
3.3865			
i: 276,	target: -0.0370,	output: -0.2876,	loss:
6.7670			
i: 277,	target: 0.1260,	output: 0.0357,	loss:
0.7165			
i: 278,	target: 0.1907,	output: 0.3191,	loss:
0.6732			
i: 279,	target: -0.0767,	output: 0.1618,	loss:
3.1090			
i: 280,	target: 0.0690,	output: -0.2166,	loss:
4.1370			
i: 281,	target: 0.2204,	output: 0.3597,	loss:
0.6321			
i: 282,	target: -0.0751,	output: 0.0279,	loss:
1.3714			
i: 283,	target: -0.0680,	output: -0.0525,	loss:

0.2286			
i: 284,	target: 0.4899,	output: -0.0062,	loss:
1.0126			
i: 285,	target: -0.0885,	output: -0.1536,	loss:
0.7361			
i: 286,	target: -0.0727,	output: -0.0268,	loss:
0.6319			
i: 287,	target: 0.1964,	output: 0.6211,	loss:
2.1618			
i: 288,	target: -0.0702,	output: 0.1214,	loss:
2.7302			
i: 289,	target: 0.1926,	output: -0.1533,	loss:
1.7961			
i: 290,	target: -0.0812,	output: -0.1358,	loss:
0.6717			
i: 291,	target: -0.0548,	output: -0.2199,	loss:
3.0165			
i: 292,	target: -0.0781,	output: 0.1569,	loss:
3.0091			
i: 293,	target: 0.1344,	output: 0.4021,	loss:
1.9924			
i: 294,	target: 0.0630,	output: -0.2337,	loss:
4.7061			
i: 295,	target: -0.0812,	output: 0.2914,	loss:
4.5904			
i: 296,	target: 0.0454,	output: -0.1248,	loss:
3.7458			
i: 297,	target: -0.0999,	output: 0.2389,	loss:
3.3901			
i: 298,	target: 0.0024,	output: 0.0911,	loss:
37.6242			
i: 299,	target: 0.1049,	output: -0.2695,	loss:
3.5683			
i: 300,	target: -0.0728,	output: -0.1511,	loss:
1.0757			
i: 301,	target: -0.0698,	output: -0.0762,	loss:
0.0926			
i: 302,	target: 0.1342,	output: 0.1439,	loss:
0.0727			
i: 303,	target: 0.1303,	output: 0.0892,	loss:
0.3150			
i: 304,	target: -0.0363,	output: 0.3785,	loss:
11.4211			
i: 305,	target: 0.3955,	output: 0.0930,	loss:
0.7648			
i: 306,	target: 0.1211,	output: -0.0723,	loss:
1.5970			
i: 307,	target: -0.0859,	output: 0.1854,	loss:

3.1571			
i: 308,	target: 0.0042,	output: 0.2574,	loss:
59.6268			
i: 309,	target: -0.0939,	output: -0.1122,	loss:
0.1948			
i: 310,	target: 0.0164,	output: 0.3453,	loss:
20.0456			
i: 311,	target: 0.0514,	output: -0.2864,	loss:
6.5742			
i: 312,	target: 0.3149,	output: -0.3716,	loss:
2.1798			
i: 313,	target: -0.0526,	output: -0.2979,	loss:
4.6673			
i: 314,	target: -0.0079,	output: -0.3741,	loss:
46.1494			
i: 315,	target: -0.0132,	output: 0.1318,	loss:
10.9619			
i: 316,	target: -0.0248,	output: -0.2292,	loss:
8.2501			
i: 317,	target: -0.0600,	output: -0.0461,	loss:
0.2322			
i: 318,	target: 0.0319,	output: -0.2183,	loss:
7.8458			
i: 319,	target: 0.1993,	output: 0.3050,	loss:
0.5301			
i: 320,	target: -0.0478,	output: 0.1655,	loss:
4.4585			
i: 321,	target: -0.0673,	output: -0.2128,	loss:
2.1619			
i: 322,	target: 0.1699,	output: -0.2172,	loss:
2.2784			
i: 323,	target: 0.1881,	output: 0.2148,	loss:
0.1417			
i: 324,	target: -0.0663,	output: 0.4529,	loss:
7.8358			
i: 325,	target: -0.0040,	output: 0.0783,	loss:
20.8202			
i: 326,	target: -0.0809,	output: -0.3529,	loss:
3.3630			
i: 327,	target: -0.0991,	output: -0.4723,	loss:
3.7653			
i: 328,	target: 0.1256,	output: -0.4133,	loss:
4.2890			
i: 329,	target: 0.1929,	output: 0.3391,	loss:
0.7575			
i: 330,	target: -0.0980,	output: 0.0268,	loss:
1.2739			
i: 331,	target: -0.0804,	output: -0.0500,	loss:

0.3777			
i: 332,	target: 0.5073,	output: 0.2058,	loss:
0.5944			
i: 333,	target: 0.4279,	output: -0.2006,	loss:
1.4687			
i: 334,	target: -0.0792,	output: -0.1062,	loss:
0.3401			
i: 335,	target: 0.0382,	output: -0.0207,	loss:
1.5409			
i: 336,	target: -0.0668,	output: -0.1747,	loss:
1.6143			
i: 337,	target: 0.1475,	output: -0.5271,	loss:
4.5736			
i: 338,	target: -0.0364,	output: -0.0117,	loss:
0.6786			
i: 339,	target: 0.2218,	output: -0.0117,	loss:
1.0527			
i: 340,	target: 0.1533,	output: 0.1720,	loss:
0.1220			
i: 341,	target: -0.0889,	output: 0.0820,	loss:
1.9220			
i: 342,	target: 0.2235,	output: 0.2498,	loss:
0.1178			
i: 343,	target: -0.0318,	output: -0.1182,	loss:
2.7192			
i: 344,	target: -0.0651,	output: 0.1681,	loss:
3.5806			
i: 345,	target: 0.3037,	output: -0.2704,	loss:
1.8904			
i: 346,	target: 0.4269,	output: 0.1091,	loss:
0.7443			
i: 347,	target: -0.0383,	output: -0.2543,	loss:
5.6328			
i: 348,	target: 0.1575,	output: 0.2709,	loss:
0.7202			
i: 349,	target: 0.1111,	output: -0.2601,	loss:
3.3407			
i: 350,	target: -0.0822,	output: -0.0754,	loss:
0.0825			
i: 351,	target: -0.0755,	output: 0.0573,	loss:
1.7591			
i: 352,	target: 0.0395,	output: -0.3671,	loss:
10.2860			
i: 353,	target: -0.0795,	output: -0.1660,	loss:
1.0877			
i: 354,	target: 0.1690,	output: -0.5370,	loss:
4.1785			
i: 355,	target: -0.0936,	output: 0.0436,	loss:

1.4657			
i: 356,	target: -0.0925,	output: 0.3486,	loss:
4.7675			
i: 357,	target: 0.6005,	output: -0.0910,	loss:
1.1515			
i: 358,	target: -0.0883,	output: -0.0919,	loss:
0.0407			
i: 359,	target: 0.1419,	output: 0.0101,	loss:
0.9289			
i: 360,	target: -0.0782,	output: -0.2352,	loss:
2.0070			
i: 361,	target: 0.2508,	output: -0.2469,	loss:
1.9845			
i: 362,	target: -0.0343,	output: -0.2246,	loss:
5.5458			
i: 363,	target: -0.0128,	output: -0.0126,	loss:
0.0176			
i: 364,	target: -0.0677,	output: -0.1119,	loss:
0.6532			
i: 365,	target: -0.0716,	output: -0.0364,	loss:
0.4914			
i: 366,	target: 0.2620,	output: 0.0193,	loss:
0.9264			
i: 367,	target: -0.0794,	output: 0.0941,	loss:
2.1852			
i: 368,	target: -0.0557,	output: 0.1156,	loss:
3.0766			
i: 369,	target: 0.0959,	output: 0.1275,	loss:
0.3300			
i: 370,	target: -0.0938,	output: -0.0704,	loss:
0.2497			
i: 371,	target: -0.0598,	output: -0.1179,	loss:
0.9705			
i: 372,	target: -0.0541,	output: 0.0503,	loss:
1.9299			
i: 373,	target: -0.0783,	output: 0.0074,	loss:
1.0951			
i: 374,	target: 0.1404,	output: 0.4449,	loss:
2.1697			
i: 375,	target: 0.1897,	output: -0.1725,	loss:
1.9093			
i: 376,	target: -0.0714,	output: 0.2028,	loss:
3.8398			
i: 377,	target: -0.0272,	output: 0.1001,	loss:
4.6738			
i: 378,	target: -0.0645,	output: 0.0974,	loss:
2.5096			
i: 379,	target: 0.1938,	output: 0.1575,	loss:

0.1871			
i: 380,	target: 0.1792,	output: 0.6688,	loss:
2.7326			
i: 381,	target: -0.0906,	output: 0.4287,	loss:
5.7339			
i: 382,	target: -0.0392,	output: 0.1884,	loss:
5.8004			
i: 383,	target: 0.2060,	output: 0.0724,	loss:
0.6484			
i: 384,	target: -0.0559,	output: -0.1774,	loss:
2.1721			
i: 385,	target: -0.0841,	output: 0.0058,	loss:
1.0694			
i: 386,	target: 0.2172,	output: -0.1790,	loss:
1.8244			
i: 387,	target: -0.0733,	output: -0.1057,	loss:
0.4419			
i: 388,	target: -0.0441,	output: -0.1935,	loss:
3.3933			
i: 389,	target: 0.1908,	output: 0.1527,	loss:
0.1997			
i: 390,	target: -0.0665,	output: -0.0046,	loss:
0.9307			
i: 391,	target: -0.0482,	output: -0.2921,	loss:
5.0613			
i: 392,	target: -0.0414,	output: 0.0731,	loss:
2.7673			
i: 393,	target: -0.0156,	output: 0.6138,	loss:
40.3741			
i: 394,	target: -0.0707,	output: -0.0656,	loss:
0.0725			
i: 395,	target: 0.4228,	output: 0.0034,	loss:
0.9919			
i: 396,	target: 0.1758,	output: 0.0910,	loss:
0.4821			
i: 397,	target: 0.2073,	output: 0.0290,	loss:
0.8602			
i: 398,	target: 0.0035,	output: -0.0814,	loss:
24.5334			
i: 399,	target: -0.0579,	output: 0.0859,	loss:
2.4832			
i: 400,	target: -0.0541,	output: 0.0324,	loss:
1.5995			
i: 401,	target: -0.0935,	output: -0.0943,	loss:
0.0080			
i: 402,	target: 0.0101,	output: -0.3531,	loss:
35.9739			
i: 403,	target: -0.1050,	output: -0.1051,	loss:

0.0015			
i: 404,	target: 0.2320,	output: 0.3092,	loss:
0.3327			
i: 405,	target: 0.3020,	output: 0.3720,	loss:
0.2319			
i: 406,	target: -0.0825,	output: -0.1299,	loss:
0.5752			
i: 407,	target: -0.1074,	output: -0.2512,	loss:
1.3388			
i: 408,	target: -0.0251,	output: -0.3328,	loss:
12.2690			
i: 409,	target: -0.0527,	output: 0.2818,	loss:
6.3455			
i: 410,	target: -0.0661,	output: -0.2772,	loss:
3.1918			
i: 411,	target: -0.0425,	output: 0.0302,	loss:
1.7107			
i: 412,	target: 0.0939,	output: -0.0263,	loss:
1.2805			
i: 413,	target: 0.2120,	output: 0.4002,	loss:
0.8872			
i: 414,	target: -0.0023,	output: 0.1532,	loss:
68.0382			
i: 415,	target: 0.1860,	output: 0.1077,	loss:
0.4206			
i: 416,	target: -0.0715,	output: 0.2715,	loss:
4.7970			
i: 417,	target: -0.0621,	output: -0.1139,	loss:
0.8346			
i: 418,	target: -0.0568,	output: -0.1283,	loss:
1.2601			
i: 419,	target: -0.0764,	output: 0.0124,	loss:
1.1620			
i: 420,	target: -0.0704,	output: 0.0388,	loss:
1.5503			
i: 421,	target: -0.0457,	output: 0.1419,	loss:
4.1068			
i: 422,	target: -0.0382,	output: 0.0550,	loss:
2.4392			
i: 423,	target: 0.1590,	output: 0.4535,	loss:
1.8519			
i: 424,	target: 0.2015,	output: -0.2936,	loss:
2.4571			
i: 425,	target: -0.0489,	output: 0.1114,	loss:
3.2773			
i: 426,	target: 0.0258,	output: -0.2965,	loss:
12.4757			
i: 427,	target: -0.0693,	output: -0.2164,	loss:

2.1236			
i: 428,	target: 0.2384,	output: -0.1604,	loss:
1.6725			
i: 429,	target: 0.1791,	output: -0.0362,	loss:
1.2020			
i: 430,	target: 0.4009,	output: 0.2290,	loss:
0.4288			
i: 431,	target: -0.1154,	output: 0.0149,	loss:
1.1292			
i: 432,	target: -0.0854,	output: -0.1525,	loss:
0.7869			
i: 433,	target: -0.0794,	output: 0.0949,	loss:
2.1961			
i: 434,	target: 0.1357,	output: 0.3731,	loss:
1.7492			
i: 435,	target: 0.1310,	output: 0.1634,	loss:
0.2477			
i: 436,	target: -0.0404,	output: 0.3563,	loss:
9.8288			
i: 437,	target: 0.0497,	output: -0.2221,	loss:
5.4729			
i: 438,	target: -0.0569,	output: -0.0109,	loss:
0.8080			
i: 439,	target: 0.1161,	output: 0.2593,	loss:
1.2324			
i: 440,	target: -0.0684,	output: 0.3794,	loss:
6.5438			
i: 441,	target: -0.0752,	output: 0.0370,	loss:
1.4920			
i: 442,	target: 0.1942,	output: -0.1134,	loss:
1.5841			
i: 443,	target: 0.0498,	output: -0.0868,	loss:
2.7413			
i: 444,	target: 0.1892,	output: 0.0550,	loss:
0.7092			
i: 445,	target: 0.3958,	output: 0.0700,	loss:
0.8232			
i: 446,	target: 0.1626,	output: -0.2971,	loss:
2.8270			
i: 447,	target: 0.3358,	output: -0.3964,	loss:
2.1804			
i: 448,	target: -0.0409,	output: 0.3021,	loss:
8.3771			
i: 449,	target: -0.0825,	output: 0.0684,	loss:
1.8289			
i: 450,	target: -0.0674,	output: -0.2098,	loss:
2.1127			
i: 451,	target: -0.0396,	output: -0.0698,	loss:

0.7634			
i: 452,	target: -0.0737,	output: -0.3432,	loss:
3.6542			
i: 453,	target: -0.0892,	output: -0.1379,	loss:
0.5461			
i: 454,	target: 0.6039,	output: -0.4535,	loss:
1.7510			
i: 455,	target: -0.0713,	output: 0.1614,	loss:
3.2629			
i: 456,	target: -0.0757,	output: -0.2414,	loss:
2.1897			
i: 457,	target: 0.1542,	output: 0.5279,	loss:
2.4235			
i: 458,	target: 0.1903,	output: -0.3057,	loss:
2.6066			
i: 459,	target: -0.0669,	output: -0.0777,	loss:
0.1619			
i: 460,	target: 0.1786,	output: 0.2561,	loss:
0.4339			
i: 461,	target: 0.0914,	output: -0.0916,	loss:
2.0028			
i: 462,	target: 0.1832,	output: -0.0561,	loss:
1.3061			
i: 463,	target: 0.2233,	output: 0.0399,	loss:
0.8214			
i: 464,	target: 0.1955,	output: 0.5947,	loss:
2.0420			
i: 465,	target: -0.0864,	output: -0.1938,	loss:
1.2442			
i: 466,	target: -0.0491,	output: -0.1858,	loss:
2.7870			
i: 467,	target: -0.0756,	output: 0.0863,	loss:
2.1412			
i: 468,	target: -0.0673,	output: 0.3880,	loss:
6.7680			
i: 469,	target: -0.0837,	output: -0.2274,	loss:
1.7181			
i: 470,	target: 0.0717,	output: -0.0784,	loss:
2.0930			
i: 471,	target: 0.0182,	output: 0.0464,	loss:
1.5501			
i: 472,	target: 0.0555,	output: -0.0955,	loss:
2.7197			
i: 473,	target: 0.1825,	output: -0.3808,	loss:
3.0859			
i: 474,	target: 0.1750,	output: -0.2102,	loss:
2.2010			
i: 475,	target: -0.0105,	output: -0.0453,	loss:

3.3194			
i: 476,	target: -0.0940,	output: 0.1630,	loss:
2.7351			
i: 477,	target: -0.0696,	output: 0.4303,	loss:
7.1847			
i: 478,	target: 0.1862,	output: -0.1602,	loss:
1.8603			
i: 479,	target: -0.0814,	output: 0.0097,	loss:
1.1188			
i: 480,	target: 0.1849,	output: 0.0680,	loss:
0.6324			
i: 481,	target: 0.0513,	output: 0.1285,	loss:
1.5032			
i: 482,	target: -0.0633,	output: 0.0575,	loss:
1.9077			
i: 483,	target: -0.0954,	output: -0.0887,	loss:
0.0703			
i: 484,	target: 0.1725,	output: -0.1943,	loss:
2.1265			
i: 485,	target: -0.0378,	output: -0.0872,	loss:
1.3097			
i: 486,	target: -0.0772,	output: -0.1522,	loss:
0.9720			
i: 487,	target: -0.0632,	output: -0.0569,	loss:
0.1004			
i: 488,	target: -0.0896,	output: -0.1747,	loss:
0.9495			
i: 489,	target: 0.0381,	output: -0.4807,	loss:
13.6213			
i: 490,	target: 0.0007,	output: 0.2025,	loss:
293.2783			
i: 491,	target: -0.0693,	output: -0.3062,	loss:
3.4148			
i: 492,	target: 0.0427,	output: -0.3428,	loss:
9.0233			
i: 493,	target: -0.0518,	output: -0.0103,	loss:
0.8006			
i: 494,	target: 0.1954,	output: 0.1995,	loss:
0.0210			
i: 495,	target: 0.1860,	output: 0.1611,	loss:
0.1335			
i: 496,	target: -0.0857,	output: 0.3087,	loss:
4.6042			
i: 497,	target: -0.0797,	output: 0.0855,	loss:
2.0724			
i: 498,	target: 0.0285,	output: -0.4200,	loss:
15.7157			
i: 499,	target: -0.0718,	output: -0.0308,	loss:

0.5711			
i: 500,	target: -0.0859,	output: -0.1093,	loss:
0.2716			
i: 501,	target: 0.0844,	output: -0.0804,	loss:
1.9517			
i: 502,	target: -0.0743,	output: -0.0469,	loss:
0.3693			
i: 503,	target: -0.0699,	output: -0.0547,	loss:
0.2169			
i: 504,	target: 0.2046,	output: 0.1541,	loss:
0.2469			
i: 505,	target: 0.1217,	output: 0.0356,	loss:
0.7075			
i: 506,	target: -0.0706,	output: 0.1960,	loss:
3.7750			
i: 507,	target: 0.0405,	output: 0.1788,	loss:
3.4142			
i: 508,	target: -0.0875,	output: -0.0855,	loss:
0.0227			
i: 509,	target: -0.0737,	output: 0.4335,	loss:
6.8784			
i: 510,	target: -0.0617,	output: -0.2717,	loss:
3.4045			
i: 511,	target: -0.0812,	output: 0.2098,	loss:
3.5818			
i: 512,	target: -0.0813,	output: -0.4408,	loss:
4.4211			
i: 513,	target: -0.0272,	output: -0.0444,	loss:
0.6326			
i: 514,	target: -0.0692,	output: -0.0238,	loss:
0.6561			
i: 515,	target: -0.0711,	output: 0.0954,	loss:
2.3424			
i: 516,	target: -0.0711,	output: 0.2155,	loss:
4.0326			
i: 517,	target: 0.0989,	output: -0.4519,	loss:
5.5674			
i: 518,	target: -0.0633,	output: -0.1796,	loss:
1.8354			
i: 519,	target: 0.0219,	output: 0.2364,	loss:
9.7998			
i: 520,	target: 0.1891,	output: 0.5286,	loss:
1.7961			
i: 521,	target: -0.0583,	output: 0.2324,	loss:
4.9854			
i: 522,	target: 0.1924,	output: -0.2522,	loss:
2.3106			
i: 523,	target: 0.0003,	output: -0.2207,	loss:

756.9521			
i: 524, 1.0100	target: -0.0902,	output: -0.1812,	loss:
i: 525, 5.1688	target: -0.0513,	output: 0.2139,	loss:
i: 526, 3.2346	target: -0.0819,	output: 0.1831,	loss:
i: 527, 0.0741	target: 0.1924,	output: 0.1781,	loss:
i: 528, 3.0994	target: 0.0476,	output: 0.1953,	loss:
i: 529, 2.0806	target: -0.0798,	output: -0.2458,	loss:
i: 530, 0.2501	target: 0.1218,	output: 0.0914,	loss:
i: 531, 3.4778	target: -0.0811,	output: -0.3633,	loss:
i: 532, 3.1143	target: -0.0683,	output: 0.1445,	loss:
i: 533, 1.2804	target: 0.3854,	output: -0.1081,	loss:
i: 534, 1.8709	target: -0.0594,	output: 0.0517,	loss:
i: 535, 0.4272	target: -0.0694,	output: -0.0397,	loss:
i: 536, 63.4263	target: 0.0014,	output: 0.0905,	loss:
i: 537, 0.8706	target: 0.1101,	output: 0.0142,	loss:
i: 538, 1.2322	target: 0.1976,	output: 0.4411,	loss:
i: 539, 4.3893	target: -0.0905,	output: 0.3067,	loss:
i: 540, 14.5410	target: 0.0351,	output: -0.4753,	loss:
i: 541, 1.7075	target: -0.0817,	output: 0.0578,	loss:
i: 542, 2.2524	target: -0.0722,	output: 0.0904,	loss:
i: 543, 3.1614	target: 0.0595,	output: -0.1287,	loss:
i: 544, 8.5954	target: -0.0791,	output: 0.6008,	loss:
i: 545, 5.8857	target: 0.0391,	output: -0.1910,	loss:
i: 546, 5.9071	target: -0.0480,	output: -0.3316,	loss:
i: 547,	target: -0.0257,	output: -0.0375,	loss:

0.4572			
i: 548,	target: 0.1642,	output: -0.3857,	loss:
3.3489			
i: 549,	target: -0.0353,	output: -0.4029,	loss:
10.4070			
i: 550,	target: 0.0485,	output: 0.0451,	loss:
0.0718			
i: 551,	target: 0.1547,	output: 0.0389,	loss:
0.7489			
i: 552,	target: -0.0647,	output: 0.2608,	loss:
5.0325			
i: 553,	target: -0.0650,	output: -0.1182,	loss:
0.8191			
i: 554,	target: -0.0433,	output: -0.2970,	loss:
5.8656			
i: 555,	target: 0.0470,	output: -0.2313,	loss:
5.9233			
i: 556,	target: -0.0650,	output: 0.0715,	loss:
2.0992			
i: 557,	target: -0.0774,	output: 0.2785,	loss:
4.5965			
i: 558,	target: -0.0723,	output: 0.2963,	loss:
5.0981			
i: 559,	target: 0.0106,	output: -0.1815,	loss:
18.1438			
i: 560,	target: -0.0627,	output: -0.0520,	loss:
0.1708			
i: 561,	target: 0.2177,	output: 0.0932,	loss:
0.5719			
i: 562,	target: 0.0234,	output: -0.0081,	loss:
1.3476			
i: 563,	target: -0.0758,	output: -0.1061,	loss:
0.4001			
i: 564,	target: -0.0604,	output: 0.0468,	loss:
1.7745			
i: 565,	target: 0.1535,	output: 0.1943,	loss:
0.2661			
i: 566,	target: -0.0736,	output: 0.2974,	loss:
5.0393			
i: 567,	target: 0.1453,	output: -0.3374,	loss:
3.3210			
i: 568,	target: 0.1801,	output: -0.0131,	loss:
1.0728			
i: 569,	target: -0.0980,	output: -0.1357,	loss:
0.3848			
i: 570,	target: -0.0565,	output: -0.2196,	loss:
2.8899			
i: 571,	target: 0.0217,	output: -0.1874,	loss:

9.6557			
i: 572,	target: 0.2042,	output: -0.0567,	loss:
1.2776			
i: 573,	target: 0.1571,	output: 0.0956,	loss:
0.3918			
i: 574,	target: -0.0708,	output: 0.1355,	loss:
2.9131			
i: 575,	target: -0.0752,	output: 0.0370,	loss:
1.4920			
i: 576,	target: -0.0935,	output: -0.3240,	loss:
2.4652			
i: 577,	target: 0.0267,	output: 0.3463,	loss:
11.9842			
i: 578,	target: -0.0767,	output: -0.1230,	loss:
0.6032			
i: 579,	target: -0.0888,	output: 0.1193,	loss:
2.3431			
i: 580,	target: 0.0350,	output: 0.0710,	loss:
1.0285			
i: 581,	target: -0.0673,	output: -0.0589,	loss:
0.1252			
i: 582,	target: -0.0548,	output: -0.2745,	loss:
4.0050			
i: 583,	target: 0.1357,	output: -0.4964,	loss:
4.6575			
i: 584,	target: 0.2460,	output: -0.1603,	loss:
1.6515			
i: 585,	target: 0.1941,	output: 0.2950,	loss:
0.5200			
i: 586,	target: 0.0975,	output: 0.0325,	loss:
0.6669			
i: 587,	target: -0.0300,	output: -0.2560,	loss:
7.5297			
i: 588,	target: -0.0851,	output: -0.1582,	loss:
0.8583			
i: 589,	target: -0.0417,	output: -0.3680,	loss:
7.8210			
i: 590,	target: -0.0658,	output: 0.1228,	loss:
2.8666			
i: 591,	target: -0.0664,	output: -0.2671,	loss:
3.0237			
i: 592,	target: 0.0800,	output: -0.0005,	loss:
1.0068			
i: 593,	target: -0.0372,	output: -0.4118,	loss:
10.0754			
i: 594,	target: 0.2264,	output: 0.1886,	loss:
0.1668			
i: 595,	target: -0.0404,	output: 0.2979,	loss:

8.3766			
i: 596,	target: -0.0976,	output: 0.0869,	loss:
1.8901			
i: 597,	target: 0.0908,	output: 0.2712,	loss:
1.9864			
i: 598,	target: -0.0654,	output: -0.2582,	loss:
2.9476			
i: 599,	target: -0.0595,	output: -0.4749,	loss:
6.9876			
i: 600,	target: -0.0441,	output: 0.2209,	loss:
6.0085			
i: 601,	target: -0.0750,	output: 0.1128,	loss:
2.5042			
i: 602,	target: -0.0441,	output: 0.0781,	loss:
2.7737			
i: 603,	target: -0.0783,	output: 0.0726,	loss:
1.9272			
i: 604,	target: 0.1126,	output: 0.0873,	loss:
0.2249			
i: 605,	target: -0.0677,	output: -0.3737,	loss:
4.5189			
i: 606,	target: 0.0232,	output: -0.0334,	loss:
2.4422			
i: 607,	target: -0.0594,	output: -0.1094,	loss:
0.8411			
i: 608,	target: 0.1776,	output: -0.2286,	loss:
2.2869			
i: 609,	target: -0.0519,	output: -0.0784,	loss:
0.5111			
i: 610,	target: 0.0437,	output: 0.0869,	loss:
0.9907			
i: 611,	target: -0.0871,	output: -0.4620,	loss:
4.3048			
i: 612,	target: -0.0826,	output: 0.0394,	loss:
1.4763			
i: 613,	target: 0.0447,	output: 0.3170,	loss:
6.0933			
i: 614,	target: -0.0419,	output: 0.3183,	loss:
8.5959			
i: 615,	target: -0.0564,	output: -0.1638,	loss:
1.9043			
i: 616,	target: 0.1158,	output: 0.0026,	loss:
0.9778			
i: 617,	target: 0.1847,	output: -0.4488,	loss:
3.4303			
i: 618,	target: 0.2034,	output: 0.0784,	loss:
0.6146			
i: 619,	target: 0.1604,	output: 0.2123,	loss:

0.3234			
i: 620,	target: -0.0189,	output: 0.0878,	loss:
5.6433			
i: 621,	target: -0.0816,	output: -0.0330,	loss:
0.5956			
i: 622,	target: 0.3678,	output: 0.0050,	loss:
0.9864			
i: 623,	target: -0.0773,	output: -0.5721,	loss:
6.3961			
i: 624,	target: -0.0647,	output: -0.1747,	loss:
1.6989			
i: 625,	target: -0.0094,	output: -0.2095,	loss:
21.3247			
i: 626,	target: 0.1847,	output: -0.6107,	loss:
4.3074			
i: 627,	target: -0.0956,	output: 0.1512,	loss:
2.5815			
i: 628,	target: 0.1467,	output: -0.2960,	loss:
3.0170			
i: 629,	target: -0.0817,	output: -0.2451,	loss:
2.0010			
i: 630,	target: 0.2224,	output: 0.0324,	loss:
0.8542			
i: 631,	target: -0.0458,	output: -0.1217,	loss:
1.6549			
i: 632,	target: 0.2275,	output: -0.1811,	loss:
1.7962			
i: 633,	target: -0.0686,	output: 0.2289,	loss:
4.3351			
i: 634,	target: -0.0679,	output: -0.1040,	loss:
0.5312			
i: 635,	target: 0.1991,	output: 0.0311,	loss:
0.8437			
i: 636,	target: 0.0664,	output: 0.3170,	loss:
3.7744			
i: 637,	target: -0.0137,	output: -0.4613,	loss:
32.7908			
i: 638,	target: -0.0726,	output: 0.2306,	loss:
4.1753			
i: 639,	target: -0.0673,	output: 0.0720,	loss:
2.0694			
i: 640,	target: -0.0813,	output: -0.3688,	loss:
3.5352			
i: 641,	target: 0.2475,	output: -0.0227,	loss:
1.0918			
i: 642,	target: -0.0131,	output: 0.0582,	loss:
5.4376			
i: 643,	target: 0.5027,	output: -0.2161,	loss:

1.4299			
i: 644,	target: -0.0420,	output: -0.2330,	loss:
4.5457			
i: 645,	target: -0.0614,	output: 0.4499,	loss:
8.3241			
i: 646,	target: -0.0376,	output: 0.1091,	loss:
3.9013			
i: 647,	target: -0.0833,	output: -0.0744,	loss:
0.1062			
i: 648,	target: 0.0207,	output: -0.0505,	loss:
3.4404			
i: 649,	target: -0.0511,	output: -0.2465,	loss:
3.8287			
i: 650,	target: -0.0891,	output: -0.1652,	loss:
0.8546			
i: 651,	target: -0.0419,	output: 0.0420,	loss:
2.0031			
i: 652,	target: 0.1284,	output: -0.1758,	loss:
2.3700			
i: 653,	target: 0.0182,	output: 0.0966,	loss:
4.3201			
i: 654,	target: -0.0864,	output: -0.2565,	loss:
1.9694			
i: 655,	target: -0.0901,	output: -0.3105,	loss:
2.4447			
i: 656,	target: -0.0585,	output: 0.2407,	loss:
5.1179			
i: 657,	target: -0.0641,	output: 0.2955,	loss:
5.6125			
i: 658,	target: -0.0580,	output: -0.1177,	loss:
1.0278			
i: 659,	target: 0.4699,	output: -0.0636,	loss:
1.1354			
i: 660,	target: -0.0448,	output: 0.2515,	loss:
6.6152			
i: 661,	target: -0.0777,	output: 0.3911,	loss:
6.0349			
i: 662,	target: -0.0178,	output: -0.0917,	loss:
4.1355			
i: 663,	target: 0.1811,	output: 0.3704,	loss:
1.0448			
i: 664,	target: -0.0444,	output: 0.0767,	loss:
2.7282			
i: 665,	target: -0.0660,	output: -0.2341,	loss:
2.5462			
i: 666,	target: 0.0537,	output: 0.1419,	loss:
1.6448			
i: 667,	target: 0.3099,	output: 0.4163,	loss:

0.3433			
i: 668,	target: -0.0916,	output: 0.2924,	loss:
4.1912			
i: 669,	target: 0.0811,	output: -0.5736,	loss:
8.0768			
i: 670,	target: -0.0810,	output: 0.1840,	loss:
3.2712			
i: 671,	target: 0.0473,	output: -0.0041,	loss:
1.0867			
i: 672,	target: 0.1216,	output: 0.0642,	loss:
0.4717			
i: 673,	target: 0.0221,	output: -0.3354,	loss:
16.1691			
i: 674,	target: 0.1620,	output: -0.0820,	loss:
1.5062			
i: 675,	target: -0.0973,	output: -0.2397,	loss:
1.4635			
i: 676,	target: -0.0914,	output: -0.0157,	loss:
0.8280			
i: 677,	target: 0.2100,	output: 0.0814,	loss:
0.6125			
i: 678,	target: -0.0845,	output: 0.3155,	loss:
4.7310			
i: 679,	target: 0.0876,	output: 0.1025,	loss:
0.1697			
i: 680,	target: -0.0651,	output: -0.2668,	loss:
3.1000			
i: 681,	target: 0.1811,	output: -0.0045,	loss:
1.0249			
i: 682,	target: 0.1172,	output: -0.2118,	loss:
2.8072			
i: 683,	target: -0.0540,	output: -0.1224,	loss:
1.2679			
i: 684,	target: -0.1039,	output: -0.2898,	loss:
1.7897			
i: 685,	target: -0.0612,	output: 0.2928,	loss:
5.7834			
i: 686,	target: 0.1443,	output: -0.0851,	loss:
1.5897			
i: 687,	target: 0.1901,	output: 0.0700,	loss:
0.6317			
i: 688,	target: -0.0805,	output: -0.0006,	loss:
0.9932			
i: 689,	target: -0.0629,	output: 0.1327,	loss:
3.1103			
i: 690,	target: -0.0408,	output: -0.0616,	loss:
0.5083			
i: 691,	target: -0.0743,	output: 0.1428,	loss:

2.9218			
i: 692,	target: 0.1545,	output: 0.2992,	loss:
0.9362			
i: 693,	target: -0.0504,	output: 0.3639,	loss:
8.2180			
i: 694,	target: 0.3934,	output: 0.2610,	loss:
0.3365			
i: 695,	target: -0.0654,	output: -0.0481,	loss:
0.2649			
i: 696,	target: -0.0464,	output: -0.1719,	loss:
2.7061			
i: 697,	target: -0.0768,	output: -0.0293,	loss:
0.6187			
i: 698,	target: 0.1970,	output: -0.0278,	loss:
1.1410			
i: 699,	target: 0.3338,	output: 0.0310,	loss:
0.9072			
i: 700,	target: 0.2008,	output: 0.0200,	loss:
0.9005			
i: 701,	target: -0.0809,	output: -0.1104,	loss:
0.3649			
i: 702,	target: -0.0505,	output: -0.3383,	loss:
5.7055			
i: 703,	target: 0.2064,	output: -0.0892,	loss:
1.4322			
i: 704,	target: -0.0577,	output: 0.2637,	loss:
5.5692			
i: 705,	target: -0.0552,	output: -0.0732,	loss:
0.3259			
i: 706,	target: 0.2102,	output: -0.6803,	loss:
4.2365			
i: 707,	target: 0.1082,	output: -0.1900,	loss:
2.7560			
i: 708,	target: -0.0843,	output: -0.4094,	loss:
3.8559			
i: 709,	target: 0.1818,	output: 0.0525,	loss:
0.7109			
i: 710,	target: 0.2160,	output: -0.3258,	loss:
2.5079			
i: 711,	target: -0.0218,	output: 0.2589,	loss:
12.8791			
i: 712,	target: 0.1538,	output: -0.4719,	loss:
4.0683			
i: 713,	target: 0.2515,	output: -0.2424,	loss:
1.9637			
i: 714,	target: -0.0733,	output: 0.0659,	loss:
1.8991			
i: 715,	target: -0.0558,	output: 0.3911,	loss:

8.0099			
i: 716,	target: 0.1454,	output: 0.0501,	loss:
0.6553			
i: 717,	target: -0.0690,	output: 0.2124,	loss:
4.0805			
i: 718,	target: 0.0246,	output: 0.1479,	loss:
5.0158			
i: 719,	target: 0.2271,	output: 0.0912,	loss:
0.5982			
i: 720,	target: -0.0130,	output: 0.2869,	loss:
23.0385			
i: 721,	target: 0.1204,	output: 0.2058,	loss:
0.7100			
i: 722,	target: -0.0611,	output: -0.1193,	loss:
0.9521			
i: 723,	target: -0.0883,	output: -0.0919,	loss:
0.0407			
i: 724,	target: -0.0543,	output: -0.1229,	loss:
1.2659			
i: 725,	target: -0.0950,	output: 0.2511,	loss:
3.6420			
i: 726,	target: 0.2053,	output: 0.1730,	loss:
0.1575			
i: 727,	target: 0.0719,	output: 0.0307,	loss:
0.5727			
i: 728,	target: 0.1907,	output: 0.3024,	loss:
0.5860			
i: 729,	target: -0.0970,	output: -0.0782,	loss:
0.1940			
i: 730,	target: 0.1074,	output: -0.1936,	loss:
2.8016			
i: 731,	target: -0.0758,	output: 0.1461,	loss:
2.9277			
i: 732,	target: 0.4133,	output: -0.3303,	loss:
1.7992			
i: 733,	target: 0.1558,	output: 0.4582,	loss:
1.9418			
i: 734,	target: 0.0315,	output: 0.1736,	loss:
4.5204			
i: 735,	target: 0.1299,	output: -0.2333,	loss:
2.7965			
i: 736,	target: -0.0760,	output: -0.0779,	loss:
0.0258			
i: 737,	target: 0.0084,	output: 0.1598,	loss:
18.0654			
i: 738,	target: -0.0640,	output: 0.2471,	loss:
4.8593			
i: 739,	target: 0.1904,	output: 0.1833,	loss:

0.0374			
i: 740,	target: 0.2261,	output: -0.0943,	loss:
1.4173			
i: 741,	target: -0.0529,	output: 0.2256,	loss:
5.2684			
i: 742,	target: -0.0860,	output: -0.4017,	loss:
3.6736			
i: 743,	target: -0.0775,	output: 0.0684,	loss:
1.8834			
i: 744,	target: 0.1528,	output: 0.0447,	loss:
0.7072			
i: 745,	target: 0.2183,	output: 0.2046,	loss:
0.0627			
i: 746,	target: -0.0739,	output: -0.1768,	loss:
1.3931			
i: 747,	target: 0.0929,	output: 0.1973,	loss:
1.1240			
i: 748,	target: 0.0322,	output: 0.0242,	loss:
0.2488			
i: 749,	target: -0.0521,	output: 0.0627,	loss:
2.2025			
i: 750,	target: 0.0224,	output: 0.2692,	loss:
11.0427			
i: 751,	target: -0.0776,	output: -0.3711,	loss:
3.7821			
i: 752,	target: -0.0718,	output: 0.1719,	loss:
3.3939			
i: 753,	target: 0.1627,	output: -0.2873,	loss:
2.7662			
i: 754,	target: 0.1474,	output: 0.3898,	loss:
1.6446			
i: 755,	target: -0.0330,	output: -0.6015,	loss:
17.2097			
i: 756,	target: 0.2063,	output: -0.1415,	loss:
1.6858			
i: 757,	target: -0.0513,	output: -0.2329,	loss:
3.5430			
i: 758,	target: 0.0324,	output: -0.3766,	loss:
12.6369			
i: 759,	target: 0.0938,	output: 0.4420,	loss:
3.7132			
i: 760,	target: -0.0841,	output: -0.1783,	loss:
1.1213			
i: 761,	target: -0.0677,	output: 0.5592,	loss:
9.2593			
i: 762,	target: -0.0527,	output: -0.1882,	loss:
2.5737			
i: 763,	target: 0.2209,	output: 0.0453,	loss:

0.7949			
i: 764,	target: 0.1392,	output: 0.1282,	loss:
0.0792			
i: 765,	target: -0.0723,	output: -0.3135,	loss:
3.3373			
i: 766,	target: 0.0092,	output: 0.3418,	loss:
36.0569			
i: 767,	target: 0.0608,	output: -0.2888,	loss:
5.7466			
i: 768,	target: -0.0154,	output: -0.0116,	loss:
0.2458			
i: 769,	target: 0.1618,	output: -0.0381,	loss:
1.2351			
i: 770,	target: 0.0408,	output: -0.3436,	loss:
9.4280			
i: 771,	target: -0.0601,	output: 0.3082,	loss:
6.1284			
i: 772,	target: -0.0412,	output: -0.2320,	loss:
4.6385			
i: 773,	target: -0.0875,	output: -0.2398,	loss:
1.7403			
i: 774,	target: -0.0721,	output: -0.1942,	loss:
1.6942			
i: 775,	target: 0.0078,	output: -0.1912,	loss:
25.5311			
i: 776,	target: -0.0872,	output: 0.0728,	loss:
1.8343			
i: 777,	target: 0.1278,	output: 0.0995,	loss:
0.2209			
i: 778,	target: -0.0893,	output: -0.1914,	loss:
1.1432			
i: 779,	target: -0.0573,	output: 0.1211,	loss:
3.1132			
i: 780,	target: -0.0537,	output: -0.3512,	loss:
5.5421			
i: 781,	target: -0.0734,	output: 0.0931,	loss:
2.2673			
i: 782,	target: 0.1736,	output: -0.3607,	loss:
3.0775			
i: 783,	target: 0.0376,	output: 0.0791,	loss:
1.1051			
i: 784,	target: -0.0872,	output: 0.1752,	loss:
3.0086			
i: 785,	target: -0.0780,	output: 0.0885,	loss:
2.1338			
i: 786,	target: -0.0276,	output: 0.1468,	loss:
6.3277			
i: 787,	target: -0.0616,	output: 0.3504,	loss:

6.6880			
i: 788,	target: 0.1851,	output: -0.2111,	loss:
2.1406			
i: 789,	target: 0.3976,	output: 0.0342,	loss:
0.9140			
i: 790,	target: -0.0753,	output: 0.4915,	loss:
7.5279			
i: 791,	target: 0.2950,	output: 0.3324,	loss:
0.1266			
i: 792,	target: 0.0272,	output: -0.1558,	loss:
6.7297			
i: 793,	target: 0.1731,	output: -0.0223,	loss:
1.1288			
i: 794,	target: 0.1544,	output: -0.4449,	loss:
3.8806			
i: 795,	target: 0.0077,	output: -0.4403,	loss:
57.8981			
i: 796,	target: -0.0590,	output: -0.2239,	loss:
2.7969			
i: 797,	target: 0.0954,	output: 0.2210,	loss:
1.3173			
i: 798,	target: 0.1758,	output: -0.1384,	loss:
1.7875			
i: 799,	target: -0.0885,	output: 0.3929,	loss:
5.4408			
i: 800,	target: 0.1290,	output: -0.3999,	loss:
4.0989			
i: 801,	target: -0.0439,	output: -0.0013,	loss:
0.9694			
i: 802,	target: -0.0691,	output: -0.0202,	loss:
0.7075			
i: 803,	target: 0.0398,	output: 0.0559,	loss:
0.4054			
i: 804,	target: -0.0772,	output: 0.2376,	loss:
4.0770			
i: 805,	target: 0.1094,	output: 0.4152,	loss:
2.7947			
i: 806,	target: -0.0857,	output: -0.0350,	loss:
0.5923			
i: 807,	target: 0.0719,	output: 0.1920,	loss:
1.6687			
i: 808,	target: -0.0748,	output: -0.0576,	loss:
0.2307			
i: 809,	target: 0.1140,	output: 0.1431,	loss:
0.2548			
i: 810,	target: -0.0516,	output: -0.1235,	loss:
1.3937			
i: 811,	target: 0.1913,	output: -0.0071,	loss:

1.0373			
i: 812,	target: -0.0793,	output: 0.2556,	loss:
4.2221			
i: 813,	target: 0.0979,	output: 0.1108,	loss:
0.1324			
i: 814,	target: -0.0748,	output: -0.0722,	loss:
0.0347			
i: 815,	target: 0.1297,	output: -0.0568,	loss:
1.4379			
i: 816,	target: 0.0260,	output: -0.1534,	loss:
6.9017			
i: 817,	target: -0.0627,	output: 0.1770,	loss:
3.8233			
i: 818,	target: 0.1878,	output: 0.0379,	loss:
0.7984			
i: 819,	target: -0.0977,	output: -0.1872,	loss:
0.9165			
i: 820,	target: 0.3901,	output: -0.0501,	loss:
1.1285			
i: 821,	target: -0.0226,	output: -0.1472,	loss:
5.5052			
i: 822,	target: -0.0863,	output: 0.1574,	loss:
2.8248			
i: 823,	target: -0.0665,	output: 0.0230,	loss:
1.3457			
i: 824,	target: 0.1832,	output: -0.1176,	loss:
1.6420			
i: 825,	target: 0.2236,	output: -0.0173,	loss:
1.0771			
i: 826,	target: 0.0944,	output: 0.0545,	loss:
0.4222			
i: 827,	target: 0.1132,	output: 0.3625,	loss:
2.2033			
i: 828,	target: 0.1927,	output: -0.1356,	loss:
1.7038			
i: 829,	target: 0.1426,	output: 0.2019,	loss:
0.4162			
i: 830,	target: -0.1092,	output: 0.3295,	loss:
4.0170			
i: 831,	target: -0.0539,	output: -0.2390,	loss:
3.4376			
i: 832,	target: 0.0291,	output: -0.1540,	loss:
6.2978			
i: 833,	target: -0.0738,	output: 0.1141,	loss:
2.5447			
i: 834,	target: 0.2254,	output: 0.2452,	loss:
0.0878			
i: 835,	target: -0.0556,	output: 0.0457,	loss:

1.8218			
i: 836,	target: -0.0419,	output: -0.1246,	loss:
1.9749			
i: 837,	target: -0.0431,	output: -0.0091,	loss:
0.7900			
i: 838,	target: 0.0418,	output: -0.4613,	loss:
12.0295			
i: 839,	target: 0.3059,	output: 0.5561,	loss:
0.8177			
i: 840,	target: 0.1132,	output: 0.2795,	loss:
1.4684			
i: 841,	target: 0.2021,	output: 0.0321,	loss:
0.8409			
i: 842,	target: 0.3610,	output: -0.5195,	loss:
2.4392			
i: 843,	target: 0.0805,	output: -0.0426,	loss:
1.5285			
i: 844,	target: 0.3500,	output: -0.1678,	loss:
1.4794			
i: 845,	target: 0.1130,	output: 0.2991,	loss:
1.6464			
i: 846,	target: 0.1588,	output: -0.4462,	loss:
3.8092			
i: 847,	target: 0.4646,	output: -0.0354,	loss:
1.0763			
i: 848,	target: 0.0202,	output: 0.0543,	loss:
1.6840			
i: 849,	target: -0.0522,	output: -0.0728,	loss:
0.3949			
i: 850,	target: 0.1852,	output: 0.4192,	loss:
1.2632			
i: 851,	target: -0.0869,	output: 0.0187,	loss:
1.2147			
i: 852,	target: -0.0815,	output: 0.0027,	loss:
1.0329			
i: 853,	target: 0.1545,	output: 0.0884,	loss:
0.4280			
i: 854,	target: 0.0352,	output: -0.0828,	loss:
3.3506			
i: 855,	target: -0.0769,	output: 0.0879,	loss:
2.1435			
i: 856,	target: -0.0646,	output: -0.0400,	loss:
0.3810			
i: 857,	target: 0.1160,	output: -0.0394,	loss:
1.3395			
i: 858,	target: 0.2329,	output: -0.2297,	loss:
1.9861			
i: 859,	target: -0.0646,	output: 0.0774,	loss:

2.1975			
i: 860,	target: 0.0425,	output: 0.2414,	loss:
4.6752			
i: 861,	target: 0.0952,	output: 0.0686,	loss:
0.2792			
i: 862,	target: -0.0722,	output: -0.1354,	loss:
0.8752			
i: 863,	target: -0.0522,	output: -0.0782,	loss:
0.4992			
i: 864,	target: 0.1794,	output: -0.3926,	loss:
3.1883			
i: 865,	target: -0.0640,	output: -0.1417,	loss:
1.2139			
i: 866,	target: -0.0767,	output: -0.1821,	loss:
1.3745			
i: 867,	target: -0.0575,	output: 0.4655,	loss:
9.0886			
i: 868,	target: 0.1809,	output: -0.3352,	loss:
2.8531			
i: 869,	target: 0.0393,	output: -0.3015,	loss:
8.6823			
i: 870,	target: -0.0748,	output: -0.2282,	loss:
2.0504			
i: 871,	target: 0.1367,	output: -0.2856,	loss:
3.0902			
i: 872,	target: -0.0519,	output: -0.1240,	loss:
1.3878			
i: 873,	target: 0.2130,	output: -0.4105,	loss:
2.9272			
i: 874,	target: 0.1917,	output: -0.3364,	loss:
2.7551			
i: 875,	target: -0.0831,	output: -0.0183,	loss:
0.7803			
i: 876,	target: -0.0392,	output: 0.0387,	loss:
1.9891			
i: 877,	target: -0.0742,	output: -0.0255,	loss:
0.6565			
i: 878,	target: -0.0352,	output: 0.2145,	loss:
7.1000			
i: 879,	target: 0.1999,	output: -0.1344,	loss:
1.6724			
i: 880,	target: 0.0496,	output: -0.3057,	loss:
7.1673			
i: 881,	target: -0.0713,	output: 0.4560,	loss:
7.3917			
i: 882,	target: 0.1136,	output: -0.0206,	loss:
1.1814			
i: 883,	target: -0.0679,	output: -0.3866,	loss:

4.6982			
i: 884,	target: -0.0495,	output: 0.2210,	loss:
5.4643			
i: 885,	target: 0.0661,	output: 0.0762,	loss:
0.1529			
i: 886,	target: -0.0676,	output: 0.1388,	loss:
3.0550			
i: 887,	target: -0.0664,	output: -0.1603,	loss:
1.4150			
i: 888,	target: 0.4356,	output: 0.1351,	loss:
0.6897			
i: 889,	target: 0.0455,	output: -0.2102,	loss:
5.6150			
i: 890,	target: 0.0417,	output: 0.0068,	loss:
0.8381			
i: 891,	target: -0.0342,	output: -0.0194,	loss:
0.4314			
i: 892,	target: 0.2472,	output: -0.1776,	loss:
1.7184			
i: 893,	target: 0.0045,	output: -0.0360,	loss:
9.0445			
i: 894,	target: -0.0829,	output: -0.3162,	loss:
2.8152			
i: 895,	target: -0.1097,	output: 0.1242,	loss:
2.1317			
i: 896,	target: -0.0375,	output: -0.0840,	loss:
1.2410			
i: 897,	target: -0.0803,	output: 0.0743,	loss:
1.9254			
i: 898,	target: 0.0875,	output: 0.1654,	loss:
0.8903			
i: 899,	target: -0.0951,	output: 0.1274,	loss:
2.3394			
i: 900,	target: -0.0717,	output: -0.2899,	loss:
3.0433			
i: 901,	target: -0.0616,	output: -0.1801,	loss:
1.9242			
i: 902,	target: 0.0947,	output: 0.2820,	loss:
1.9795			
i: 903,	target: 0.0275,	output: -0.1267,	loss:
5.6067			
i: 904,	target: 0.2347,	output: -0.0108,	loss:
1.0461			
i: 905,	target: 0.1993,	output: -0.0254,	loss:
1.1274			
i: 906,	target: -0.0677,	output: -0.1707,	loss:
1.5220			
i: 907,	target: 0.2289,	output: 0.0803,	loss:

0.6494			
i: 908,	target: 0.1528,	output: 0.1501,	loss:
0.0180			
i: 909,	target: 0.0950,	output: -0.0819,	loss:
1.8626			
i: 910,	target: 0.0518,	output: 0.0838,	loss:
0.6192			
i: 911,	target: -0.0597,	output: -0.1206,	loss:
1.0214			
i: 912,	target: -0.0472,	output: -0.1826,	loss:
2.8649			
i: 913,	target: 0.2058,	output: 0.0168,	loss:
0.9184			
i: 914,	target: -0.0527,	output: -0.1279,	loss:
1.4248			
i: 915,	target: -0.0232,	output: -0.4906,	loss:
20.1705			
i: 916,	target: 0.0027,	output: -0.0186,	loss:
7.8106			
i: 917,	target: -0.0791,	output: 0.2086,	loss:
3.6379			
i: 918,	target: -0.0711,	output: 0.1291,	loss:
2.8168			
i: 919,	target: -0.0412,	output: -0.1516,	loss:
2.6841			
i: 920,	target: -0.0527,	output: 0.1700,	loss:
4.2246			
i: 921,	target: -0.0518,	output: 0.1408,	loss:
3.7172			
i: 922,	target: -0.0529,	output: -0.2458,	loss:
3.6454			
i: 923,	target: -0.0297,	output: -0.0935,	loss:
2.1505			
i: 924,	target: 0.2247,	output: -0.1270,	loss:
1.5653			
i: 925,	target: 0.1805,	output: -0.2198,	loss:
2.2174			
i: 926,	target: 0.1473,	output: -0.1299,	loss:
1.8823			
i: 927,	target: 0.1949,	output: -0.1482,	loss:
1.7605			
i: 928,	target: -0.0470,	output: 0.2115,	loss:
5.4963			
i: 929,	target: -0.0716,	output: 0.1672,	loss:
3.3340			
i: 930,	target: 0.2007,	output: -0.0986,	loss:
1.4912			
i: 931,	target: 0.1384,	output: 0.2096,	loss:

0.5146			
i: 932,	target: -0.0703,	output: -0.2503,	loss:
2.5607			
i: 933,	target: -0.0242,	output: -0.0063,	loss:
0.7409			
i: 934,	target: -0.0547,	output: 0.2619,	loss:
5.7867			
i: 935,	target: -0.0959,	output: -0.0503,	loss:
0.4753			
i: 936,	target: 0.0640,	output: -0.0770,	loss:
2.2024			
i: 937,	target: -0.0326,	output: 0.1293,	loss:
4.9679			
i: 938,	target: -0.0572,	output: -0.0567,	loss:
0.0087			
i: 939,	target: -0.0794,	output: 0.0624,	loss:
1.7868			
i: 940,	target: -0.0698,	output: 0.0104,	loss:
1.1484			
i: 941,	target: -0.0182,	output: 0.3864,	loss:
22.2347			
i: 942,	target: 0.1451,	output: 0.5447,	loss:
2.7535			
i: 943,	target: 0.1947,	output: -0.3483,	loss:
2.7885			
i: 944,	target: -0.0794,	output: 0.5906,	loss:
8.4367			
i: 945,	target: -0.0572,	output: -0.5761,	loss:
9.0794			
i: 946,	target: -0.0538,	output: 0.3964,	loss:
8.3637			
i: 947,	target: 0.1120,	output: -0.2055,	loss:
2.8352			
i: 948,	target: -0.0851,	output: -0.1225,	loss:
0.4402			
i: 949,	target: 0.1727,	output: 0.2513,	loss:
0.4547			
i: 950,	target: -0.0727,	output: -0.1269,	loss:
0.7448			
i: 951,	target: -0.0134,	output: 0.2615,	loss:
20.5716			
i: 952,	target: 0.1958,	output: -0.1751,	loss:
1.8945			
i: 953,	target: -0.0874,	output: 0.1056,	loss:
2.2084			
i: 954,	target: -0.0003,	output: 0.1395,	loss:
480.2608			
i: 955,	target: 0.1551,	output: 0.2029,	loss:

0.3086			
i: 956,	target: 0.0407,	output: -0.1080,	loss:
3.6558			
i: 957,	target: 0.1775,	output: 0.1512,	loss:
0.1482			
i: 958,	target: -0.0519,	output: -0.0131,	loss:
0.7484			
i: 959,	target: -0.0765,	output: 0.2497,	loss:
4.2618			
i: 960,	target: -0.0764,	output: -0.1933,	loss:
1.5295			
i: 961,	target: -0.0735,	output: -0.2245,	loss:
2.0545			
i: 962,	target: 0.2419,	output: -0.0881,	loss:
1.3643			
i: 963,	target: -0.0335,	output: -0.4642,	loss:
12.8470			
i: 964,	target: 0.1544,	output: -0.3827,	loss:
3.4782			
i: 965,	target: -0.0252,	output: 0.0833,	loss:
4.3012			
i: 966,	target: -0.0703,	output: 0.1478,	loss:
3.1026			
i: 967,	target: -0.0532,	output: -0.3865,	loss:
6.2719			
i: 968,	target: 0.1748,	output: -0.0976,	loss:
1.5585			
i: 969,	target: 0.0943,	output: 0.1387,	loss:
0.4716			
i: 970,	target: -0.0563,	output: 0.3551,	loss:
7.3043			
i: 971,	target: 0.1422,	output: -0.3121,	loss:
3.1954			
i: 972,	target: -0.0378,	output: -0.0007,	loss:
0.9806			
i: 973,	target: -0.0564,	output: 0.2779,	loss:
5.9273			
i: 974,	target: -0.0607,	output: 0.0881,	loss:
2.4509			
i: 975,	target: 0.4865,	output: -0.0819,	loss:
1.1683			
i: 976,	target: -0.0138,	output: -0.0321,	loss:
1.3367			
i: 977,	target: -0.0753,	output: 0.1127,	loss:
2.4961			
i: 978,	target: 0.1906,	output: 0.1454,	loss:
0.2375			
i: 979,	target: -0.0701,	output: -0.0204,	loss:

0.7093			
i: 980,	target: -0.0144,	output: -0.0918,	loss:
5.3665			
i: 981,	target: -0.0738,	output: -0.2060,	loss:
1.7900			
i: 982,	target: 0.0094,	output: 0.0178,	loss:
0.8996			
i: 983,	target: -0.0772,	output: 0.2432,	loss:
4.1500			
i: 984,	target: 0.0393,	output: -0.3511,	loss:
9.9417			
i: 985,	target: 0.0433,	output: -0.3143,	loss:
8.2664			
i: 986,	target: 0.1427,	output: -0.2167,	loss:
2.5184			
i: 987,	target: -0.0809,	output: 0.2909,	loss:
4.5959			
i: 988,	target: 0.0161,	output: 0.1462,	loss:
8.0546			
i: 989,	target: -0.0873,	output: -0.0660,	loss:
0.2449			
i: 990,	target: 0.1777,	output: 0.0138,	loss:
0.9221			
i: 991,	target: -0.1017,	output: 0.1366,	loss:
2.3430			
i: 992,	target: 0.0354,	output: 0.1949,	loss:
4.5036			
i: 993,	target: -0.0146,	output: -0.1518,	loss:
9.3862			
i: 994,	target: -0.0333,	output: 0.1623,	loss:
5.8765			
i: 995,	target: 0.1611,	output: -0.4751,	loss:
3.9490			
i: 996,	target: -0.0363,	output: 0.0312,	loss:
1.8610			
i: 997,	target: 0.0822,	output: 0.1597,	loss:
0.9433			
i: 998,	target: 0.0450,	output: 0.1790,	loss:
2.9761			
i: 999,	target: -0.0387,	output: 0.2348,	loss:
7.0682			

Average loss: 5.1170

Saved in: peptide-QML/checkpoints/0809/txts/0809-sh_em_1qm_validation_1.txt

```
[ ]: # push changes to git
    if initial_path != '..':
```

```
!cd peptide-QML && git add . && git commit -m "data trained model" && git_
↪push
```

```
[main ade61ba0] data trained model
9 files changed, 1037 insertions(+)
create mode 100644 checkpoints/0809/models/0809-sh_em_1qm_1.pth
create mode 100644 checkpoints/0809/plots/0809-sh_em_1qm_losses_batches_1.png
create mode 100644 checkpoints/0809/plots/0809-sh_em_1qm_losses_epoch_1.png
create mode 100644
checkpoints/0809/plots/0809-sh_em_1qm_losses_epoch_validation_1.png
create mode 100644
checkpoints/0809/plots/0809-sh_em_1qm_parameter_0.weight_None_1.png
create mode 100644
checkpoints/0809/plots/0809-sh_em_1qm_parameter_2.block_weights_None_1.png
create mode 100644
checkpoints/0809/plots/0809-sh_em_1qm_parameter_2.embedding_weights_None_1.png
create mode 100644 checkpoints/0809/txts/0809-sh_em_1qm_model_str_1.txt
create mode 100644 checkpoints/0809/txts/0809-sh_em_1qm_validation_1.txt
Enumerating objects: 22, done.
Counting objects: 100% (22/22), done.
Delta compression using up to 24 threads
Compressing objects: 100% (16/16), done.
Writing objects: 100% (16/16), 149.78 KiB | 7.88 MiB/s, done.
Total 16 (delta 5), reused 0 (delta 0)
remote: Resolving deltas: 100% (5/5), completed with 5 local objects.
To github.com:raulconchello/peptide-QML.git
3c8beae1..ade61ba0 main -> main
```