

# 0725-small\_hybrid\_model\_1q\_measurement

July 25, 2023

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

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

```
[3]: import sys
sys.path.append('.')

from my_code import functions as f
```

## 1 Data

```
[4]: file_path = '../data/energies/Trial/Strings_Energies_4_aa.txt' # Replace with
    ↳ the actual path to your 'data.txt' file
string_list, number_list = f.read_data_file(file_path)
score_list = np.array(number_list)/100
angles_list = np.array([f.string_to_numbers(string) for string in string_list])
```

```
[5]: X, Y, X_validation, Y_validation = f.create_validating_set(angles_list,
    ↳ score_list, percentage=0.1)
```

```
[6]: # Define the dataset
input_data = torch.tensor(X, dtype=torch.float32)
target_data = torch.tensor(Y, dtype=torch.float32).view(-1, 1)

# Define the validation set
input_validation = torch.tensor(X_validation, dtype=torch.float32)
target_validation = torch.tensor(Y_validation, dtype=torch.float32).view(-1, 1)
```

## 2 Quantum node

```
[7]: import pennylane as qml
```

```
[8]: def qml_RZZ(params, wires):
    """
```

*RZZ gate.*

"""

```
qml.CNOT(wires=wires)
qml.RZ(params, wires=wires[1])
qml.CNOT(wires=wires)
```

```
[9]: n_qubits = 4
n_layers_block = 3
n_layers_embedding = 3
n_layers = n_layers_block + n_layers_embedding
n_params = 5
dev = qml.device("default.qubit", wires=n_qubits)

@qml.qnode(dev)
def qnode(inputs, weights):

    # state preparation (we create an embedding with 3 layers, paper: 2001.
    ↪03622)
    for i in range(n_layers_embedding):

        # angle embedding for each qubit
        qml.AngleEmbedding(inputs, wires=range(n_qubits))

        # ZZ rotation for neighboring qubits
        for x in range(2):
            for j in range(x, n_qubits, 2):
                qml_RZZ(weights[i, j, 0], wires=[j, (j+1)%n_qubits])

        # rotations for each qubit
        for j in range(n_qubits):
            qml.RY(weights[i, j, 1], wires=j)

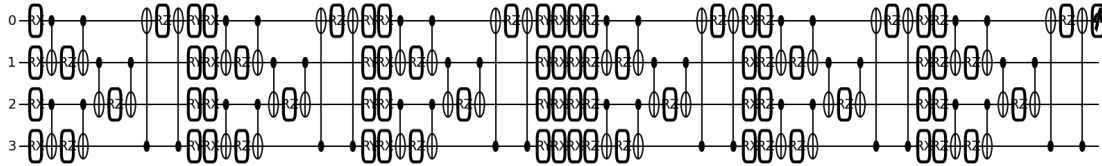
        # last angle embedding
        qml.AngleEmbedding(inputs, wires=range(n_qubits))

    #layers
    for i in range(n_layers_embedding, n_layers):
        # rotations for each qubit
        for j in range(n_qubits):
            qml.RX(weights[i, j, 2], wires=j)
            qml.RZ(weights[i, j, 3], wires=j)

        # ZZ rotation for neighboring qubits
        for x in range(2):
            for j in range(x, n_qubits, 2):
                qml_RZZ(weights[i, j, 4], wires=[j, (j+1)%n_qubits])
```

```
# measurement
return [qml.expval(qml.PauliZ(wires=0))]
```

```
[10]: qml.drawer.use_style("black_white")
fig, ax = qml.draw_mpl(qnode, expansion_strategy="device")([i for i in
    range(n_qubits)], np.zeros((n_layers, n_qubits, n_params)))
fig.set_size_inches((16,3))
```



```
[11]: weight_shapes = {"weights": (n_layers, n_qubits, n_params)}
```

```
[12]: qlayer = qml.qnn.TorchLayer(qnode, weight_shapes)
```

### 3 Hybrid model

```
[13]: class MultiplyBy10Layer(nn.Module):
    def __init__(self):
        super(MultiplyBy10Layer, self).__init__()

    def forward(self, x):
        return x * 10
```

```
[14]: input_dim = input_data.size(1)

layers = [nn.Linear(input_dim*1, input_dim*2), nn.ReLU()]
layers += [nn.Linear(input_dim*2, input_dim*3), nn.ReLU()]
layers += [nn.Linear(input_dim*3, input_dim*2), nn.ReLU()]
layers += [nn.Linear(input_dim*2, input_dim*1)]
layers += [qlayer, MultiplyBy10Layer()]
Net = nn.Sequential(*layers)
```

```
[15]: # Create an instance of the network
model = Net
```

```
[16]: import time
```

```
[17]: # time
start_time = time.time()
```

```

# Define the loss function and optimizer
criterion = nn.MSELoss() # Mean Squared Error loss
# optimizer = optim.Adam(model.parameters(), lr=0.001) # Adam optimizer with
↳ learning rate 0.001
optimizer = optim.SGD(model.parameters(), lr=0.01)

# Training loop
num_epochs = 10
batch_size = 32

losses = []
losses_epochs = []

for epoch in range(num_epochs):
    # Shuffle the dataset
    indices = torch.randperm(input_data.size(0))
    input_data = input_data[indices]
    target_data = target_data[indices]

    losses_epochs.append(0)

    # Mini-batch training
    for i in range(0, input_data.size(0), batch_size):
        inputs = input_data[i:i+batch_size]
        targets = target_data[i:i+batch_size]

        # Forward pass
        outputs = model(inputs)

        # Compute the loss
        loss = criterion(outputs, targets)

        # Backward pass and optimization
        optimizer.zero_grad()
        loss.backward()
        optimizer.step()

        # Store the loss
        losses.append(loss.item())

    print('- Epoch [{}/{}], i: [{}/{}], Loss: {:.4f}'.format(epoch+1,
↳ num_epochs, i, input_data.size(0), loss.item()), end='\r')

    # add to the epoch loss
    losses_epochs[-1] += loss.item()

```

```

# divide the epoch loss by the number of batches, to get the average loss
losses_epochs[-1] /= (input_data.size(0)/batch_size)

# time
# Compute elapsed time and remaining time
elapsed_time = time.time() - start_time
avg_time_per_epoch = elapsed_time / (epoch + 1)
remaining_epochs = num_epochs - (epoch + 1)
estimated_remaining_time = avg_time_per_epoch * remaining_epochs

# Convert remaining time to hours, minutes, and seconds for better
↳readability
hours, remainder = divmod(estimated_remaining_time, 3600)
minutes, seconds = divmod(remainder, 60)

# Print the loss and remaining time for this epoch
print('Epoch [{}/{}], Loss: {:.4f}, Time remaining: ~{}h {}m {:.0f}s'.
↳format(
    epoch+1, num_epochs, losses_epochs[-1], hours, minutes, seconds))

```

```

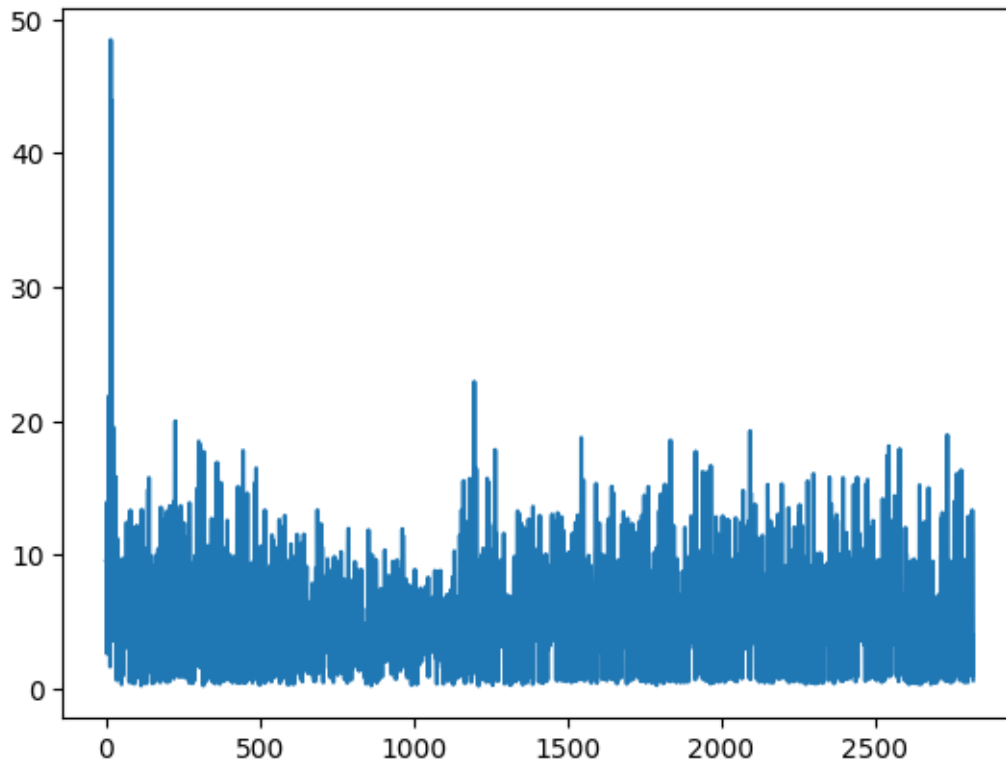
Epoch [1/10], Loss: 6.4965, Time remaining: ~0.0h 7.0m 34s
Epoch [2/10], Loss: 5.5070, Time remaining: ~0.0h 6.0m 52s
Epoch [3/10], Loss: 4.7558, Time remaining: ~0.0h 6.0m 5s
Epoch [4/10], Loss: 4.3262, Time remaining: ~0.0h 5.0m 7s
Epoch [5/10], Loss: 5.4676, Time remaining: ~0.0h 4.0m 11s
Epoch [6/10], Loss: 5.5468, Time remaining: ~0.0h 3.0m 22s
Epoch [7/10], Loss: 5.5411, Time remaining: ~0.0h 2.0m 31s
Epoch [8/10], Loss: 5.5715, Time remaining: ~0.0h 1.0m 38s
Epoch [9/10], Loss: 5.5666, Time remaining: ~0.0h 0.0m 48s
Epoch [10/10], Loss: 5.5353, Time remaining: ~0.0h 0.0m 0s

```

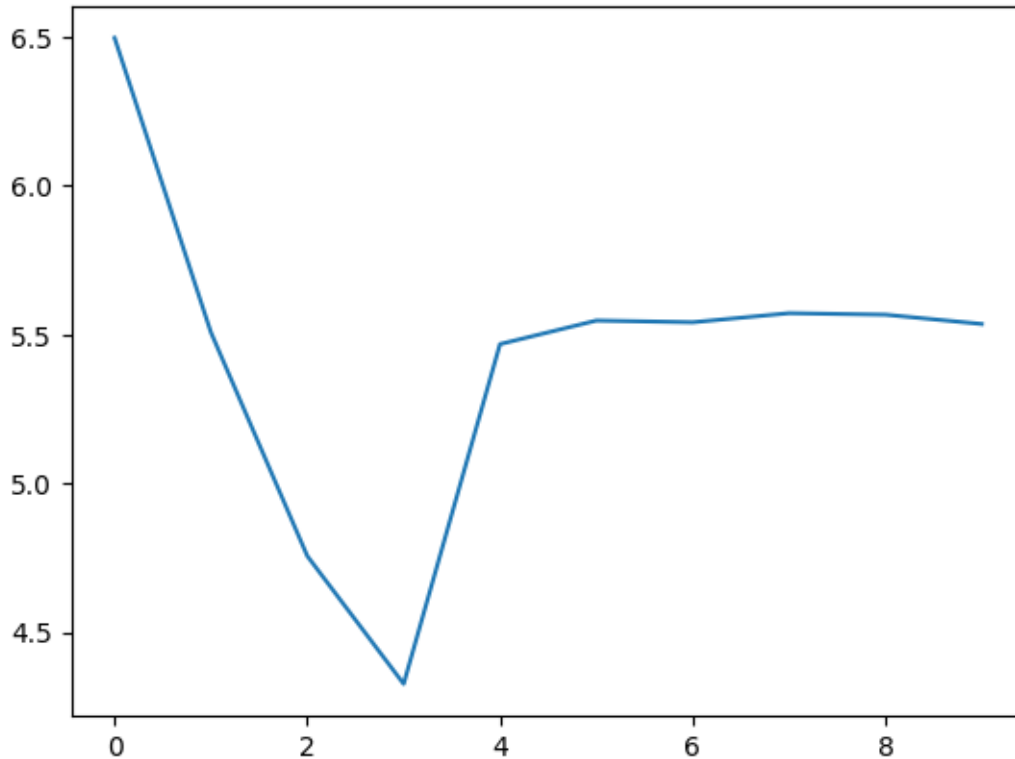
```

[18]: #plot the loss
import matplotlib.pyplot as plt
plt.plot(losses)
plt.show()

```



```
[19]: #plot the loss  
import matplotlib.pyplot as plt  
plt.plot(losses_epochs)  
plt.show()
```



```
[20]: avg_loss = 0
for x, (i, t) in enumerate(zip((input_validation), target_validation)):
    loss = criterion(model(i), t)
    avg_loss += loss/len(target_validation)
    print('i: {}, \t target: {:.3f}, \t output: {:.3f}, \t loss: {:.3f}'.
          format(x, t.item(), model(i).item(), loss))

print('Average loss: {:.3f}'.format(avg_loss))
```

```
i: 0, target: -0.313, output: -0.428, loss: 0.013
i: 1, target: -0.882, output: -0.428, loss: 0.206
i: 2, target: -0.545, output: -0.428, loss: 0.014
i: 3, target: 9.582, output: -0.428, loss: 100.186
i: 4, target: -0.841, output: -0.428, loss: 0.171
i: 5, target: -0.549, output: -0.428, loss: 0.015
i: 6, target: -1.454, output: -0.428, loss: 1.052
i: 7, target: -0.712, output: -0.428, loss: 0.081
i: 8, target: -0.933, output: -0.428, loss: 0.255
i: 9, target: -0.722, output: -0.428, loss: 0.087
i: 10, target: -0.843, output: -0.428, loss: 0.173
i: 11, target: -0.729, output: -0.428, loss: 0.091
i: 12, target: -0.979, output: -0.428, loss: 0.303
```

i: 13, target: 9.622, output: -0.428, loss: 101.004  
i: 14, target: -0.917, output: -0.428, loss: 0.240  
i: 15, target: -2.158, output: -0.428, loss: 2.992  
i: 16, target: -1.020, output: -0.428, loss: 0.350  
i: 17, target: -1.473, output: -0.428, loss: 1.093  
i: 18, target: -1.149, output: -0.428, loss: 0.520  
i: 19, target: -1.236, output: -0.428, loss: 0.652  
i: 20, target: -0.421, output: -0.428, loss: 0.000  
i: 21, target: -1.236, output: -0.428, loss: 0.653  
i: 22, target: -0.691, output: -0.428, loss: 0.070  
i: 23, target: -0.481, output: -0.428, loss: 0.003  
i: 24, target: -0.802, output: -0.428, loss: 0.140  
i: 25, target: -0.892, output: -0.428, loss: 0.216  
i: 26, target: -1.281, output: -0.428, loss: 0.728  
i: 27, target: 8.892, output: -0.428, loss: 86.854  
i: 28, target: -0.950, output: -0.428, loss: 0.273  
i: 29, target: -1.273, output: -0.428, loss: 0.714  
i: 30, target: -1.713, output: -0.428, loss: 1.653  
i: 31, target: -0.594, output: -0.428, loss: 0.028  
i: 32, target: -2.621, output: -0.428, loss: 4.810  
i: 33, target: -1.491, output: -0.428, loss: 1.130  
i: 34, target: -1.283, output: -0.428, loss: 0.731  
i: 35, target: -1.061, output: -0.428, loss: 0.401  
i: 36, target: -0.970, output: -0.428, loss: 0.294  
i: 37, target: -0.814, output: -0.428, loss: 0.149  
i: 38, target: -0.737, output: -0.428, loss: 0.096  
i: 39, target: 0.505, output: -0.428, loss: 0.870  
i: 40, target: -0.513, output: -0.428, loss: 0.007  
i: 41, target: -0.533, output: -0.428, loss: 0.011  
i: 42, target: -0.440, output: -0.428, loss: 0.000  
i: 43, target: -1.344, output: -0.428, loss: 0.840  
i: 44, target: -1.290, output: -0.428, loss: 0.744  
i: 45, target: -0.620, output: -0.390, loss: 0.053  
i: 46, target: -0.299, output: -0.428, loss: 0.017  
i: 47, target: -0.777, output: -0.428, loss: 0.122  
i: 48, target: -1.407, output: -0.428, loss: 0.960  
i: 49, target: -0.883, output: -0.428, loss: 0.207  
i: 50, target: -0.565, output: -0.428, loss: 0.019  
i: 51, target: -0.794, output: -0.428, loss: 0.134  
i: 52, target: 9.315, output: -0.428, loss: 94.929  
i: 53, target: -0.340, output: -0.428, loss: 0.008  
i: 54, target: -0.479, output: -0.428, loss: 0.003  
i: 55, target: -0.702, output: -0.428, loss: 0.075  
i: 56, target: -1.152, output: -0.428, loss: 0.524  
i: 57, target: -0.641, output: -0.428, loss: 0.046  
i: 58, target: 0.340, output: -0.428, loss: 0.590  
i: 59, target: -0.548, output: -0.428, loss: 0.015  
i: 60, target: -0.687, output: -0.428, loss: 0.067



i: 61, target: -0.193, output: -0.428, loss: 0.055  
i: 62, target: -0.721, output: -0.428, loss: 0.086  
i: 63, target: -1.092, output: -0.428, loss: 0.442  
i: 64, target: -0.728, output: -0.428, loss: 0.090  
i: 65, target: 9.921, output: -0.428, loss: 107.096  
i: 66, target: 9.763, output: -0.428, loss: 103.845  
i: 67, target: -0.706, output: -0.428, loss: 0.077  
i: 68, target: -0.579, output: -0.428, loss: 0.023  
i: 69, target: -0.552, output: -0.428, loss: 0.016  
i: 70, target: -0.625, output: -0.428, loss: 0.039  
i: 71, target: -1.480, output: -0.428, loss: 1.107  
i: 72, target: -0.505, output: -0.428, loss: 0.006  
i: 73, target: -0.999, output: -0.428, loss: 0.326  
i: 74, target: 0.001, output: -0.428, loss: 0.184  
i: 75, target: -0.678, output: -0.428, loss: 0.063  
i: 76, target: -1.549, output: -0.428, loss: 1.257  
i: 77, target: -1.973, output: -0.428, loss: 2.388  
i: 78, target: -1.586, output: -0.428, loss: 1.342  
i: 79, target: -0.786, output: -0.428, loss: 0.128  
i: 80, target: 8.834, output: -0.428, loss: 85.785  
i: 81, target: -1.267, output: -0.428, loss: 0.703  
i: 82, target: -1.113, output: -0.428, loss: 0.470  
i: 83, target: -0.836, output: -0.428, loss: 0.166  
i: 84, target: -0.636, output: -0.428, loss: 0.043  
i: 85, target: -0.633, output: -0.428, loss: 0.042  
i: 86, target: -1.244, output: -0.428, loss: 0.666  
i: 87, target: -1.880, output: -0.428, loss: 2.109  
i: 88, target: -0.694, output: -0.428, loss: 0.071  
i: 89, target: -0.504, output: -0.428, loss: 0.006  
i: 90, target: -0.757, output: -0.428, loss: 0.109  
i: 91, target: -1.762, output: -0.428, loss: 1.779  
i: 92, target: -0.999, output: -0.428, loss: 0.326  
i: 93, target: -1.467, output: -0.428, loss: 1.079  
i: 94, target: -2.503, output: -0.428, loss: 4.305  
i: 95, target: -0.890, output: -0.428, loss: 0.213  
i: 96, target: -2.365, output: -0.428, loss: 3.753  
i: 97, target: -0.487, output: -0.428, loss: 0.004  
i: 98, target: -1.545, output: -0.428, loss: 1.249  
i: 99, target: -0.634, output: -0.428, loss: 0.042  
i: 100, target: -1.536, output: -0.428, loss: 1.228  
i: 101, target: -2.017, output: -0.428, loss: 2.527  
i: 102, target: -1.339, output: -0.428, loss: 0.831  
i: 103, target: 0.172, output: -0.428, loss: 0.359  
i: 104, target: -0.485, output: -0.428, loss: 0.003  
i: 105, target: 0.286, output: -0.428, loss: 0.510  
i: 106, target: -0.542, output: -0.379, loss: 0.026  
i: 107, target: 0.615, output: -0.428, loss: 1.088  
i: 108, target: -0.695, output: -0.428, loss: 0.071

i: 109, target: -0.688, output: -0.428, loss: 0.068  
i: 110, target: -0.672, output: -0.428, loss: 0.060  
i: 111, target: -0.700, output: -0.428, loss: 0.074  
i: 112, target: -0.641, output: -0.428, loss: 0.046  
i: 113, target: -1.621, output: -0.428, loss: 1.423  
i: 114, target: -0.635, output: -0.428, loss: 0.043  
i: 115, target: -1.206, output: -0.428, loss: 0.605  
i: 116, target: -0.691, output: -0.428, loss: 0.069  
i: 117, target: -1.687, output: -0.428, loss: 1.584  
i: 118, target: -1.788, output: -0.428, loss: 1.850  
i: 119, target: -1.397, output: -0.428, loss: 0.940  
i: 120, target: -2.828, output: -0.428, loss: 5.763  
i: 121, target: -1.133, output: -0.428, loss: 0.498  
i: 122, target: -1.303, output: -0.428, loss: 0.767  
i: 123, target: -0.576, output: -0.428, loss: 0.022  
i: 124, target: -1.911, output: -0.428, loss: 2.201  
i: 125, target: -2.141, output: -0.428, loss: 2.937  
i: 126, target: -1.007, output: -0.428, loss: 0.335  
i: 127, target: -0.886, output: -0.428, loss: 0.210  
i: 128, target: -0.943, output: -0.428, loss: 0.266  
i: 129, target: -1.663, output: -0.428, loss: 1.526  
i: 130, target: -1.302, output: -0.428, loss: 0.765  
i: 131, target: 0.335, output: -0.428, loss: 0.582  
i: 132, target: -0.857, output: -0.428, loss: 0.184  
i: 133, target: -0.755, output: -0.428, loss: 0.107  
i: 134, target: 9.579, output: -0.428, loss: 100.142  
i: 135, target: -0.878, output: -0.428, loss: 0.203  
i: 136, target: -0.624, output: -0.428, loss: 0.039  
i: 137, target: -0.693, output: -0.428, loss: 0.070  
i: 138, target: -0.617, output: -0.428, loss: 0.036  
i: 139, target: -0.306, output: -0.428, loss: 0.015  
i: 140, target: -0.583, output: -0.428, loss: 0.024  
i: 141, target: -0.546, output: -0.428, loss: 0.014  
i: 142, target: -0.602, output: -0.389, loss: 0.045  
i: 143, target: -1.083, output: -0.428, loss: 0.429  
i: 144, target: -0.971, output: -0.428, loss: 0.296  
i: 145, target: -1.427, output: -0.428, loss: 0.998  
i: 146, target: -1.335, output: -0.428, loss: 0.824  
i: 147, target: -1.683, output: -0.428, loss: 1.575  
i: 148, target: -0.522, output: -0.428, loss: 0.009  
i: 149, target: -1.163, output: -0.428, loss: 0.540  
i: 150, target: -0.914, output: -0.428, loss: 0.236  
i: 151, target: -0.694, output: -0.428, loss: 0.071  
i: 152, target: -0.683, output: -0.427, loss: 0.066  
i: 153, target: -0.635, output: -0.428, loss: 0.043  
i: 154, target: -1.844, output: -0.428, loss: 2.005  
i: 155, target: -0.837, output: -0.428, loss: 0.167  
i: 156, target: -1.703, output: -0.428, loss: 1.627

i: 157, target: -0.560, output: -0.428, loss: 0.017  
i: 158, target: 9.054, output: -0.428, loss: 89.902  
i: 159, target: -0.950, output: -0.428, loss: 0.273  
i: 160, target: -2.094, output: -0.428, loss: 2.775  
i: 161, target: -0.692, output: -0.428, loss: 0.070  
i: 162, target: -1.326, output: -0.428, loss: 0.806  
i: 163, target: -0.965, output: -0.428, loss: 0.288  
i: 164, target: -2.129, output: -0.428, loss: 2.893  
i: 165, target: 9.344, output: -0.428, loss: 95.492  
i: 166, target: -1.118, output: -0.428, loss: 0.476  
i: 167, target: -0.418, output: -0.428, loss: 0.000  
i: 168, target: 8.857, output: -0.428, loss: 86.202  
i: 169, target: -1.241, output: -0.428, loss: 0.662  
i: 170, target: -0.643, output: -0.428, loss: 0.046  
i: 171, target: -1.091, output: -0.428, loss: 0.440  
i: 172, target: -1.101, output: -0.428, loss: 0.454  
i: 173, target: -1.334, output: -0.428, loss: 0.821  
i: 174, target: -0.735, output: -0.428, loss: 0.094  
i: 175, target: -1.453, output: -0.428, loss: 1.051  
i: 176, target: -1.401, output: -0.428, loss: 0.948  
i: 177, target: -0.732, output: -0.428, loss: 0.093  
i: 178, target: -1.794, output: -0.428, loss: 1.868  
i: 179, target: -1.211, output: -0.428, loss: 0.613  
i: 180, target: -1.395, output: -0.428, loss: 0.936  
i: 181, target: -1.336, output: -0.428, loss: 0.825  
i: 182, target: -1.309, output: -0.428, loss: 0.777  
i: 183, target: -0.440, output: -0.411, loss: 0.001  
i: 184, target: -1.324, output: -0.428, loss: 0.802  
i: 185, target: -1.676, output: -0.428, loss: 1.558  
i: 186, target: -0.336, output: -0.428, loss: 0.008  
i: 187, target: -0.802, output: -0.428, loss: 0.140  
i: 188, target: -1.302, output: -0.428, loss: 0.764  
i: 189, target: 0.232, output: -0.428, loss: 0.435  
i: 190, target: 9.415, output: -0.428, loss: 96.879  
i: 191, target: -0.400, output: -0.428, loss: 0.001  
i: 192, target: -1.579, output: -0.428, loss: 1.326  
i: 193, target: -1.252, output: -0.428, loss: 0.679  
i: 194, target: -1.574, output: -0.428, loss: 1.314  
i: 195, target: 1.308, output: -0.428, loss: 3.012  
i: 196, target: -0.938, output: -0.428, loss: 0.260  
i: 197, target: -1.824, output: -0.428, loss: 1.949  
i: 198, target: -0.623, output: -0.428, loss: 0.038  
i: 199, target: -1.150, output: -0.428, loss: 0.521  
i: 200, target: -0.205, output: -0.428, loss: 0.050  
i: 201, target: -1.022, output: -0.428, loss: 0.354  
i: 202, target: -0.675, output: -0.428, loss: 0.061  
i: 203, target: -0.495, output: -0.428, loss: 0.005  
i: 204, target: -0.532, output: -0.428, loss: 0.011

i: 205, target: 0.326, output: -0.428, loss: 0.568  
i: 206, target: -0.247, output: -0.428, loss: 0.033  
i: 207, target: -0.865, output: -0.428, loss: 0.191  
i: 208, target: -0.168, output: -0.428, loss: 0.067  
i: 209, target: -1.178, output: -0.428, loss: 0.563  
i: 210, target: 9.602, output: -0.428, loss: 100.605  
i: 211, target: -1.410, output: -0.428, loss: 0.965  
i: 212, target: 9.722, output: -0.428, loss: 103.018  
i: 213, target: -1.310, output: -0.428, loss: 0.778  
i: 214, target: -0.502, output: -0.428, loss: 0.006  
i: 215, target: -0.650, output: -0.573, loss: 0.006  
i: 216, target: -0.667, output: -0.428, loss: 0.057  
i: 217, target: -1.475, output: -0.428, loss: 1.096  
i: 218, target: -1.059, output: -0.428, loss: 0.398  
i: 219, target: -0.690, output: -0.428, loss: 0.069  
i: 220, target: -0.365, output: -0.428, loss: 0.004  
i: 221, target: -1.523, output: -0.428, loss: 1.199  
i: 222, target: -1.405, output: -0.428, loss: 0.955  
i: 223, target: -1.735, output: -0.428, loss: 1.708  
i: 224, target: -0.419, output: -0.428, loss: 0.000  
i: 225, target: -1.779, output: -0.428, loss: 1.825  
i: 226, target: -1.171, output: -0.428, loss: 0.552  
i: 227, target: -0.866, output: -0.428, loss: 0.192  
i: 228, target: -1.509, output: -0.428, loss: 1.169  
i: 229, target: -1.247, output: -0.428, loss: 0.670  
i: 230, target: -0.815, output: -0.428, loss: 0.150  
i: 231, target: -0.740, output: -0.428, loss: 0.098  
i: 232, target: -0.654, output: -0.428, loss: 0.051  
i: 233, target: -0.879, output: -0.428, loss: 0.204  
i: 234, target: -0.190, output: -0.428, loss: 0.057  
i: 235, target: -0.098, output: -0.428, loss: 0.109  
i: 236, target: -0.488, output: -0.428, loss: 0.004  
i: 237, target: -0.637, output: -0.428, loss: 0.044  
i: 238, target: -0.722, output: -0.428, loss: 0.087  
i: 239, target: -1.286, output: -0.428, loss: 0.736  
i: 240, target: -1.685, output: -0.428, loss: 1.581  
i: 241, target: -0.528, output: -0.428, loss: 0.010  
i: 242, target: -1.679, output: -0.428, loss: 1.565  
i: 243, target: -0.234, output: -0.428, loss: 0.037  
i: 244, target: -0.227, output: -0.428, loss: 0.040  
i: 245, target: -1.392, output: -0.428, loss: 0.929  
i: 246, target: -0.271, output: -0.428, loss: 0.025  
i: 247, target: -0.792, output: -0.428, loss: 0.132  
i: 248, target: -0.435, output: -0.428, loss: 0.000  
i: 249, target: -0.554, output: -0.428, loss: 0.016  
i: 250, target: -3.055, output: -0.428, loss: 6.903  
i: 251, target: 0.365, output: -0.428, loss: 0.628  
i: 252, target: -1.369, output: -0.428, loss: 0.887

i: 253, target: -0.576, output: -0.428, loss: 0.022  
i: 254, target: -1.049, output: -0.428, loss: 0.385  
i: 255, target: -0.541, output: -0.428, loss: 0.013  
i: 256, target: -1.469, output: -0.428, loss: 1.085  
i: 257, target: -0.676, output: -0.428, loss: 0.062  
i: 258, target: -0.495, output: -0.428, loss: 0.004  
i: 259, target: -1.800, output: -0.428, loss: 1.883  
i: 260, target: -1.871, output: -0.428, loss: 2.083  
i: 261, target: -1.833, output: -0.428, loss: 1.974  
i: 262, target: -0.204, output: -0.428, loss: 0.050  
i: 263, target: -0.569, output: -0.428, loss: 0.020  
i: 264, target: -0.597, output: -0.428, loss: 0.029  
i: 265, target: -0.725, output: -0.428, loss: 0.088  
i: 266, target: -1.699, output: -0.428, loss: 1.616  
i: 267, target: -0.740, output: -0.428, loss: 0.097  
i: 268, target: -0.488, output: -0.428, loss: 0.004  
i: 269, target: -0.475, output: -0.428, loss: 0.002  
i: 270, target: -0.894, output: -0.428, loss: 0.217  
i: 271, target: -1.163, output: -0.428, loss: 0.540  
i: 272, target: -1.163, output: -0.428, loss: 0.541  
i: 273, target: -1.243, output: -0.428, loss: 0.665  
i: 274, target: -0.833, output: -0.428, loss: 0.164  
i: 275, target: -1.147, output: -0.428, loss: 0.517  
i: 276, target: -1.181, output: -0.428, loss: 0.567  
i: 277, target: -0.373, output: -0.428, loss: 0.003  
i: 278, target: -1.316, output: -0.428, loss: 0.790  
i: 279, target: -1.083, output: -0.428, loss: 0.429  
i: 280, target: -1.285, output: -0.428, loss: 0.734  
i: 281, target: 0.697, output: -0.428, loss: 1.265  
i: 282, target: -1.384, output: -0.428, loss: 0.915  
i: 283, target: -0.276, output: -0.428, loss: 0.023  
i: 284, target: 9.001, output: -0.428, loss: 88.907  
i: 285, target: -0.893, output: -0.428, loss: 0.216  
i: 286, target: -1.205, output: -0.428, loss: 0.604  
i: 287, target: -0.892, output: -0.428, loss: 0.216  
i: 288, target: -1.389, output: -0.428, loss: 0.924  
i: 289, target: -1.371, output: -0.428, loss: 0.890  
i: 290, target: -0.620, output: -0.428, loss: 0.037  
i: 291, target: -1.213, output: -0.428, loss: 0.617  
i: 292, target: -0.820, output: -0.428, loss: 0.154  
i: 293, target: -0.836, output: -0.428, loss: 0.167  
i: 294, target: 0.431, output: -0.428, loss: 0.737  
i: 295, target: -0.395, output: -0.428, loss: 0.001  
i: 296, target: -0.685, output: -0.428, loss: 0.066  
i: 297, target: -1.770, output: -0.428, loss: 1.801  
i: 298, target: -1.461, output: -0.428, loss: 1.067  
i: 299, target: -1.411, output: -0.428, loss: 0.966  
i: 300, target: -0.648, output: -0.428, loss: 0.049

i: 301, target: -1.865, output: -0.428, loss: 2.065  
i: 302, target: -0.589, output: -0.428, loss: 0.026  
i: 303, target: -0.761, output: -0.428, loss: 0.111  
i: 304, target: -1.209, output: -0.428, loss: 0.610  
i: 305, target: -0.240, output: -0.428, loss: 0.035  
i: 306, target: -1.321, output: -0.428, loss: 0.798  
i: 307, target: -1.129, output: -0.428, loss: 0.491  
i: 308, target: -0.962, output: -0.428, loss: 0.285  
i: 309, target: -1.033, output: -0.428, loss: 0.367  
i: 310, target: -1.548, output: -0.428, loss: 1.255  
i: 311, target: -0.205, output: -0.428, loss: 0.050  
i: 312, target: -1.041, output: -0.428, loss: 0.376  
i: 313, target: -1.394, output: -0.428, loss: 0.934  
i: 314, target: -2.341, output: -0.428, loss: 3.659  
i: 315, target: -0.866, output: -0.428, loss: 0.192  
i: 316, target: -0.958, output: -0.428, loss: 0.281  
i: 317, target: -1.255, output: -0.428, loss: 0.683  
i: 318, target: -1.810, output: -0.428, loss: 1.910  
i: 319, target: -2.045, output: -0.428, loss: 2.614  
i: 320, target: -1.047, output: -0.428, loss: 0.383  
i: 321, target: -2.069, output: -0.428, loss: 2.692  
i: 322, target: -1.430, output: -0.428, loss: 1.004  
i: 323, target: -0.984, output: -0.428, loss: 0.310  
i: 324, target: -0.647, output: -0.428, loss: 0.048  
i: 325, target: -0.651, output: -0.428, loss: 0.050  
i: 326, target: 9.728, output: -0.428, loss: 103.134  
i: 327, target: -1.551, output: -0.428, loss: 1.261  
i: 328, target: -1.750, output: -0.428, loss: 1.747  
i: 329, target: -1.353, output: -0.428, loss: 0.857  
i: 330, target: -1.683, output: -0.428, loss: 1.574  
i: 331, target: -1.637, output: -0.428, loss: 1.461  
i: 332, target: -1.474, output: -0.428, loss: 1.094  
i: 333, target: -0.947, output: -0.428, loss: 0.270  
i: 334, target: -1.097, output: -0.428, loss: 0.448  
i: 335, target: -0.610, output: -0.428, loss: 0.033  
i: 336, target: 0.197, output: -0.428, loss: 0.390  
i: 337, target: 7.648, output: -0.428, loss: 65.215  
i: 338, target: -0.821, output: -0.428, loss: 0.155  
i: 339, target: -1.761, output: -0.428, loss: 1.776  
i: 340, target: -0.473, output: -0.428, loss: 0.002  
i: 341, target: -1.518, output: -0.428, loss: 1.189  
i: 342, target: -0.970, output: -0.428, loss: 0.294  
i: 343, target: -0.674, output: -0.428, loss: 0.061  
i: 344, target: -0.305, output: -0.428, loss: 0.015  
i: 345, target: -2.083, output: -0.428, loss: 2.739  
i: 346, target: -0.591, output: -0.428, loss: 0.027  
i: 347, target: -2.086, output: -0.428, loss: 2.748  
i: 348, target: -1.381, output: -0.428, loss: 0.909

i: 349, target: -0.964, output: -0.428, loss: 0.288  
i: 350, target: -1.509, output: -0.428, loss: 1.168  
i: 351, target: -1.306, output: -0.428, loss: 0.771  
i: 352, target: -0.916, output: -0.428, loss: 0.238  
i: 353, target: -0.516, output: -0.428, loss: 0.008  
i: 354, target: -1.227, output: -0.428, loss: 0.639  
i: 355, target: -0.835, output: -0.428, loss: 0.166  
i: 356, target: -0.734, output: -0.428, loss: 0.094  
i: 357, target: -1.585, output: -0.428, loss: 1.339  
i: 358, target: -0.831, output: -0.428, loss: 0.163  
i: 359, target: -0.540, output: -0.428, loss: 0.013  
i: 360, target: -1.395, output: -0.428, loss: 0.935  
i: 361, target: -1.480, output: -0.428, loss: 1.108  
i: 362, target: -0.428, output: -0.428, loss: 0.000  
i: 363, target: -1.889, output: -0.428, loss: 2.135  
i: 364, target: -0.047, output: -0.428, loss: 0.145  
i: 365, target: -0.918, output: -0.428, loss: 0.241  
i: 366, target: -0.992, output: -0.425, loss: 0.322  
i: 367, target: -2.040, output: -0.428, loss: 2.599  
i: 368, target: -1.231, output: -0.428, loss: 0.645  
i: 369, target: -1.051, output: -0.428, loss: 0.388  
i: 370, target: -1.749, output: -0.428, loss: 1.745  
i: 371, target: -0.773, output: -0.428, loss: 0.119  
i: 372, target: -1.117, output: -0.428, loss: 0.475  
i: 373, target: -0.713, output: -0.428, loss: 0.081  
i: 374, target: 0.639, output: -0.428, loss: 1.138  
i: 375, target: -0.895, output: -0.428, loss: 0.219  
i: 376, target: -1.440, output: -0.428, loss: 1.024  
i: 377, target: -2.019, output: -0.428, loss: 2.531  
i: 378, target: -1.561, output: -0.428, loss: 1.284  
i: 379, target: -1.543, output: -0.428, loss: 1.244  
i: 380, target: -0.463, output: -0.428, loss: 0.001  
i: 381, target: -1.313, output: -0.428, loss: 0.783  
i: 382, target: 0.517, output: -0.428, loss: 0.893  
i: 383, target: -2.066, output: -0.428, loss: 2.682  
i: 384, target: -0.677, output: -0.428, loss: 0.062  
i: 385, target: -1.121, output: -0.428, loss: 0.481  
i: 386, target: -0.756, output: -0.428, loss: 0.108  
i: 387, target: -0.757, output: -0.428, loss: 0.108  
i: 388, target: -1.629, output: -0.428, loss: 1.442  
i: 389, target: -1.398, output: -0.428, loss: 0.941  
i: 390, target: -1.602, output: -0.428, loss: 1.380  
i: 391, target: -0.675, output: -0.428, loss: 0.061  
i: 392, target: -0.580, output: -0.428, loss: 0.023  
i: 393, target: -0.343, output: -0.428, loss: 0.007  
i: 394, target: -1.394, output: -0.428, loss: 0.934  
i: 395, target: -0.805, output: -0.428, loss: 0.142  
i: 396, target: -0.870, output: -0.428, loss: 0.196

i: 397, target: -0.561, output: -0.428, loss: 0.018  
i: 398, target: -1.314, output: -0.428, loss: 0.786  
i: 399, target: -0.861, output: -0.428, loss: 0.187  
i: 400, target: -0.419, output: -0.428, loss: 0.000  
i: 401, target: -1.540, output: -0.428, loss: 1.237  
i: 402, target: -0.713, output: -0.428, loss: 0.081  
i: 403, target: -1.252, output: -0.428, loss: 0.679  
i: 404, target: -1.706, output: -0.428, loss: 1.634  
i: 405, target: -0.370, output: -0.428, loss: 0.003  
i: 406, target: -1.860, output: -0.428, loss: 2.051  
i: 407, target: -0.238, output: -0.428, loss: 0.036  
i: 408, target: -0.694, output: -0.428, loss: 0.071  
i: 409, target: -0.607, output: -0.428, loss: 0.032  
i: 410, target: -1.327, output: -0.428, loss: 0.808  
i: 411, target: -0.778, output: -0.428, loss: 0.123  
i: 412, target: -0.219, output: -0.428, loss: 0.043  
i: 413, target: -0.663, output: -0.428, loss: 0.055  
i: 414, target: -0.835, output: -0.428, loss: 0.166  
i: 415, target: -0.466, output: -0.397, loss: 0.005  
i: 416, target: 9.667, output: -0.428, loss: 101.896  
i: 417, target: -1.284, output: -0.428, loss: 0.734  
i: 418, target: -0.366, output: -0.428, loss: 0.004  
i: 419, target: -0.855, output: -0.428, loss: 0.183  
i: 420, target: 9.154, output: -0.428, loss: 91.804  
i: 421, target: 0.669, output: -0.428, loss: 1.202  
i: 422, target: -0.009, output: -0.428, loss: 0.175  
i: 423, target: -0.409, output: -0.428, loss: 0.000  
i: 424, target: -1.141, output: -0.428, loss: 0.509  
i: 425, target: 9.311, output: -0.428, loss: 94.850  
i: 426, target: -0.621, output: -0.428, loss: 0.037  
i: 427, target: -0.815, output: -0.428, loss: 0.150  
i: 428, target: -0.991, output: -0.428, loss: 0.317  
i: 429, target: -1.560, output: -0.428, loss: 1.281  
i: 430, target: -0.764, output: -0.428, loss: 0.113  
i: 431, target: -0.687, output: -0.428, loss: 0.067  
i: 432, target: -3.055, output: -0.428, loss: 6.904  
i: 433, target: -1.164, output: -0.428, loss: 0.541  
i: 434, target: -0.256, output: -0.572, loss: 0.100  
i: 435, target: -1.411, output: -0.428, loss: 0.967  
i: 436, target: -2.034, output: -0.428, loss: 2.579  
i: 437, target: -1.288, output: -0.428, loss: 0.741  
i: 438, target: -0.852, output: -0.428, loss: 0.180  
i: 439, target: -0.927, output: -0.428, loss: 0.249  
i: 440, target: -1.276, output: -0.428, loss: 0.719  
i: 441, target: -1.008, output: -0.428, loss: 0.336  
i: 442, target: -0.593, output: -0.428, loss: 0.027  
i: 443, target: -0.567, output: -0.428, loss: 0.019  
i: 444, target: -1.234, output: -0.428, loss: 0.649



i: 445, target: -1.295, output: -0.428, loss: 0.752  
i: 446, target: -1.190, output: -0.428, loss: 0.581  
i: 447, target: -0.920, output: -0.428, loss: 0.242  
i: 448, target: -1.206, output: -0.428, loss: 0.605  
i: 449, target: -1.190, output: -0.428, loss: 0.581  
i: 450, target: -0.648, output: -0.428, loss: 0.049  
i: 451, target: -0.344, output: -0.428, loss: 0.007  
i: 452, target: -0.639, output: -0.428, loss: 0.045  
i: 453, target: -0.715, output: -0.428, loss: 0.082  
i: 454, target: -0.703, output: -0.428, loss: 0.076  
i: 455, target: -0.664, output: -0.428, loss: 0.056  
i: 456, target: -0.828, output: -0.428, loss: 0.161  
i: 457, target: -0.930, output: -0.428, loss: 0.252  
i: 458, target: -0.450, output: -0.428, loss: 0.000  
i: 459, target: -0.605, output: -0.428, loss: 0.031  
i: 460, target: -0.687, output: -0.428, loss: 0.067  
i: 461, target: -1.198, output: -0.428, loss: 0.593  
i: 462, target: -0.920, output: -0.428, loss: 0.243  
i: 463, target: -0.604, output: -0.428, loss: 0.031  
i: 464, target: -1.332, output: -0.428, loss: 0.817  
i: 465, target: -0.939, output: -0.428, loss: 0.262  
i: 466, target: -0.647, output: -0.428, loss: 0.048  
i: 467, target: -0.619, output: -0.428, loss: 0.036  
i: 468, target: -1.294, output: -0.428, loss: 0.750  
i: 469, target: -0.844, output: -0.428, loss: 0.173  
i: 470, target: -1.522, output: -0.428, loss: 1.196  
i: 471, target: -0.612, output: -0.428, loss: 0.034  
i: 472, target: 0.438, output: -0.428, loss: 0.749  
i: 473, target: 0.028, output: -0.428, loss: 0.208  
i: 474, target: -1.009, output: -0.428, loss: 0.338  
i: 475, target: -0.979, output: -0.428, loss: 0.304  
i: 476, target: -0.445, output: -0.428, loss: 0.000  
i: 477, target: -0.797, output: -0.428, loss: 0.137  
i: 478, target: -1.200, output: -0.428, loss: 0.596  
i: 479, target: -1.981, output: -0.428, loss: 2.413  
i: 480, target: -0.583, output: -0.428, loss: 0.024  
i: 481, target: -1.510, output: -0.428, loss: 1.171  
i: 482, target: -0.692, output: -0.428, loss: 0.070  
i: 483, target: -0.580, output: -0.428, loss: 0.023  
i: 484, target: -1.578, output: -0.428, loss: 1.322  
i: 485, target: -1.077, output: -0.428, loss: 0.422  
i: 486, target: -1.759, output: -0.428, loss: 1.772  
i: 487, target: -1.474, output: -0.428, loss: 1.095  
i: 488, target: -1.032, output: -0.428, loss: 0.365  
i: 489, target: -2.137, output: -0.428, loss: 2.922  
i: 490, target: -2.069, output: -0.428, loss: 2.694  
i: 491, target: -1.972, output: -0.428, loss: 2.383  
i: 492, target: -1.882, output: -0.428, loss: 2.115

i: 493, target: -1.158, output: -0.428, loss: 0.533  
i: 494, target: -0.438, output: -0.428, loss: 0.000  
i: 495, target: -0.600, output: -0.428, loss: 0.030  
i: 496, target: -0.738, output: -0.428, loss: 0.096  
i: 497, target: -0.453, output: -0.428, loss: 0.001  
i: 498, target: -1.541, output: -0.428, loss: 1.240  
i: 499, target: -1.495, output: -0.428, loss: 1.138  
i: 500, target: -0.660, output: -0.428, loss: 0.054  
i: 501, target: -1.647, output: -0.428, loss: 1.487  
i: 502, target: -3.030, output: -0.428, loss: 6.773  
i: 503, target: -0.599, output: -0.428, loss: 0.029  
i: 504, target: -1.334, output: -0.428, loss: 0.821  
i: 505, target: -1.064, output: -0.428, loss: 0.405  
i: 506, target: -1.104, output: -0.428, loss: 0.457  
i: 507, target: -0.454, output: -0.428, loss: 0.001  
i: 508, target: -0.491, output: -0.428, loss: 0.004  
i: 509, target: -0.970, output: -0.428, loss: 0.294  
i: 510, target: 9.595, output: -0.428, loss: 100.456  
i: 511, target: -1.737, output: -0.428, loss: 1.713  
i: 512, target: -1.260, output: -0.428, loss: 0.693  
i: 513, target: -0.994, output: -0.428, loss: 0.321  
i: 514, target: 9.247, output: -0.428, loss: 93.611  
i: 515, target: -1.282, output: -0.428, loss: 0.730  
i: 516, target: -1.686, output: -0.428, loss: 1.582  
i: 517, target: -1.106, output: -0.428, loss: 0.461  
i: 518, target: -0.741, output: -0.428, loss: 0.098  
i: 519, target: -0.789, output: -0.428, loss: 0.130  
i: 520, target: -0.702, output: -0.428, loss: 0.075  
i: 521, target: -1.368, output: -0.428, loss: 0.884  
i: 522, target: -0.631, output: -0.428, loss: 0.041  
i: 523, target: 1.034, output: -0.428, loss: 2.138  
i: 524, target: 9.532, output: -0.428, loss: 99.201  
i: 525, target: -0.675, output: -0.428, loss: 0.061  
i: 526, target: 0.660, output: -0.428, loss: 1.183  
i: 527, target: -1.211, output: -0.428, loss: 0.613  
i: 528, target: -1.221, output: -0.428, loss: 0.629  
i: 529, target: -1.428, output: -0.428, loss: 1.001  
i: 530, target: -0.186, output: -0.428, loss: 0.059  
i: 531, target: -0.614, output: -0.428, loss: 0.035  
i: 532, target: -1.133, output: -0.428, loss: 0.497  
i: 533, target: -0.245, output: -0.428, loss: 0.034  
i: 534, target: -0.557, output: -0.428, loss: 0.017  
i: 535, target: -1.299, output: -0.428, loss: 0.758  
i: 536, target: -0.808, output: -0.428, loss: 0.145  
i: 537, target: -1.781, output: -0.428, loss: 1.831  
i: 538, target: -0.847, output: -0.428, loss: 0.176  
i: 539, target: -1.395, output: -0.428, loss: 0.936  
i: 540, target: -0.833, output: -0.428, loss: 0.164

i: 541, target: -1.496, output: -0.428, loss: 1.142  
i: 542, target: -0.958, output: -0.428, loss: 0.281  
i: 543, target: -0.806, output: -0.428, loss: 0.143  
i: 544, target: 0.778, output: -0.428, loss: 1.454  
i: 545, target: -0.990, output: -0.428, loss: 0.316  
i: 546, target: -0.718, output: -0.428, loss: 0.084  
i: 547, target: -1.194, output: -0.428, loss: 0.587  
i: 548, target: -2.024, output: -0.428, loss: 2.547  
i: 549, target: -1.664, output: -0.428, loss: 1.529  
i: 550, target: -1.131, output: -0.428, loss: 0.494  
i: 551, target: -0.893, output: -0.428, loss: 0.216  
i: 552, target: -1.234, output: -0.428, loss: 0.650  
i: 553, target: -1.865, output: -0.428, loss: 2.064  
i: 554, target: 8.537, output: -0.428, loss: 80.371  
i: 555, target: -1.183, output: -0.428, loss: 0.570  
i: 556, target: -0.617, output: -0.428, loss: 0.036  
i: 557, target: -1.216, output: -0.428, loss: 0.622  
i: 558, target: -1.007, output: -0.428, loss: 0.336  
i: 559, target: -1.634, output: -0.428, loss: 1.455  
i: 560, target: -1.425, output: -0.428, loss: 0.995  
i: 561, target: -1.943, output: -0.428, loss: 2.296  
i: 562, target: -0.894, output: -0.428, loss: 0.217  
i: 563, target: -0.475, output: -0.470, loss: 0.000  
i: 564, target: -1.503, output: -0.428, loss: 1.156  
i: 565, target: -1.350, output: -0.428, loss: 0.851  
i: 566, target: -1.828, output: -0.428, loss: 1.961  
i: 567, target: -0.690, output: -0.428, loss: 0.069  
i: 568, target: -0.501, output: -0.428, loss: 0.005  
i: 569, target: -1.139, output: -0.428, loss: 0.505  
i: 570, target: -0.375, output: -0.428, loss: 0.003  
i: 571, target: -0.633, output: -0.428, loss: 0.042  
i: 572, target: -1.873, output: -0.428, loss: 2.089  
i: 573, target: -1.416, output: -0.428, loss: 0.977  
i: 574, target: -0.760, output: -0.428, loss: 0.110  
i: 575, target: -0.542, output: -0.428, loss: 0.013  
i: 576, target: -0.614, output: -0.428, loss: 0.035  
i: 577, target: -1.307, output: -0.428, loss: 0.773  
i: 578, target: -0.744, output: -0.428, loss: 0.100  
i: 579, target: 0.406, output: -0.428, loss: 0.695  
i: 580, target: -1.848, output: -0.428, loss: 2.017  
i: 581, target: -0.972, output: -0.428, loss: 0.296  
i: 582, target: 0.534, output: -0.428, loss: 0.924  
i: 583, target: -2.262, output: -0.428, loss: 3.365  
i: 584, target: -0.718, output: -0.428, loss: 0.084  
i: 585, target: -1.267, output: -0.428, loss: 0.705  
i: 586, target: -0.670, output: -0.428, loss: 0.059  
i: 587, target: -1.351, output: -0.428, loss: 0.853  
i: 588, target: -0.504, output: -0.428, loss: 0.006

i: 589, target: -2.125, output: -0.428, loss: 2.879  
i: 590, target: -0.643, output: -0.428, loss: 0.046  
i: 591, target: -0.799, output: -0.428, loss: 0.138  
i: 592, target: -1.408, output: -0.428, loss: 0.962  
i: 593, target: -1.240, output: -0.428, loss: 0.660  
i: 594, target: -0.697, output: -0.428, loss: 0.072  
i: 595, target: -0.800, output: -0.428, loss: 0.139  
i: 596, target: -0.624, output: -0.428, loss: 0.039  
i: 597, target: -1.227, output: -0.428, loss: 0.639  
i: 598, target: -1.492, output: -0.428, loss: 1.132  
i: 599, target: -0.237, output: -0.428, loss: 0.037  
i: 600, target: -0.729, output: -0.428, loss: 0.090  
i: 601, target: -0.704, output: -0.428, loss: 0.077  
i: 602, target: -0.733, output: -0.428, loss: 0.093  
i: 603, target: -0.792, output: -0.428, loss: 0.132  
i: 604, target: -1.798, output: -0.428, loss: 1.878  
i: 605, target: -1.086, output: -0.428, loss: 0.433  
i: 606, target: -0.895, output: -0.428, loss: 0.218  
i: 607, target: 0.060, output: -0.428, loss: 0.238  
i: 608, target: 9.764, output: -0.428, loss: 103.869  
i: 609, target: -1.756, output: -0.428, loss: 1.765  
i: 610, target: 9.576, output: -0.428, loss: 100.069  
i: 611, target: -0.793, output: -0.428, loss: 0.134  
i: 612, target: -0.676, output: -0.428, loss: 0.062  
i: 613, target: 9.438, output: -0.428, loss: 97.335  
i: 614, target: -1.355, output: -0.428, loss: 0.860  
i: 615, target: -0.661, output: -0.428, loss: 0.054  
i: 616, target: -0.809, output: -0.428, loss: 0.146  
i: 617, target: -0.432, output: -0.428, loss: 0.000  
i: 618, target: -1.586, output: -0.428, loss: 1.341  
i: 619, target: -1.028, output: -0.428, loss: 0.360  
i: 620, target: -1.561, output: -0.428, loss: 1.284  
i: 621, target: 0.958, output: -0.428, loss: 1.919  
i: 622, target: -0.630, output: -0.428, loss: 0.041  
i: 623, target: -2.005, output: -0.428, loss: 2.486  
i: 624, target: 9.415, output: -0.428, loss: 96.879  
i: 625, target: -0.384, output: -0.428, loss: 0.002  
i: 626, target: -0.829, output: -0.428, loss: 0.161  
i: 627, target: -0.277, output: -0.428, loss: 0.023  
i: 628, target: -0.855, output: -0.428, loss: 0.183  
i: 629, target: -0.832, output: -0.428, loss: 0.163  
i: 630, target: -0.656, output: -0.428, loss: 0.052  
i: 631, target: 0.498, output: -0.427, loss: 0.855  
i: 632, target: -0.984, output: -0.428, loss: 0.309  
i: 633, target: 9.755, output: -0.428, loss: 103.694  
i: 634, target: -1.204, output: -0.428, loss: 0.602  
i: 635, target: 0.101, output: -0.428, loss: 0.280  
i: 636, target: -0.589, output: -0.428, loss: 0.026

i: 637, target: -0.652, output: -0.428, loss: 0.050  
i: 638, target: -1.702, output: -0.428, loss: 1.625  
i: 639, target: -2.305, output: -0.428, loss: 3.523  
i: 640, target: -0.913, output: -0.428, loss: 0.235  
i: 641, target: -0.702, output: -0.428, loss: 0.075  
i: 642, target: -1.270, output: -0.428, loss: 0.710  
i: 643, target: -0.480, output: -0.428, loss: 0.003  
i: 644, target: -0.918, output: -0.428, loss: 0.240  
i: 645, target: -0.363, output: -0.428, loss: 0.004  
i: 646, target: -0.557, output: -0.428, loss: 0.017  
i: 647, target: -0.492, output: -0.428, loss: 0.004  
i: 648, target: -0.536, output: -0.428, loss: 0.012  
i: 649, target: -0.487, output: -0.428, loss: 0.004  
i: 650, target: 0.024, output: -0.428, loss: 0.204  
i: 651, target: -0.833, output: -0.428, loss: 0.164  
i: 652, target: 0.351, output: -0.428, loss: 0.606  
i: 653, target: 0.676, output: -0.428, loss: 1.219  
i: 654, target: -0.140, output: -0.428, loss: 0.083  
i: 655, target: -0.968, output: -0.428, loss: 0.292  
i: 656, target: -1.083, output: -0.428, loss: 0.429  
i: 657, target: -1.885, output: -0.428, loss: 2.125  
i: 658, target: -1.248, output: -0.428, loss: 0.673  
i: 659, target: -0.856, output: -0.428, loss: 0.184  
i: 660, target: -1.906, output: -0.428, loss: 2.186  
i: 661, target: -0.751, output: -0.428, loss: 0.104  
i: 662, target: -1.206, output: -0.428, loss: 0.606  
i: 663, target: -1.310, output: -0.428, loss: 0.778  
i: 664, target: -0.988, output: -0.428, loss: 0.313  
i: 665, target: -0.007, output: -0.428, loss: 0.177  
i: 666, target: -0.403, output: -0.428, loss: 0.001  
i: 667, target: -1.289, output: -0.428, loss: 0.741  
i: 668, target: -0.641, output: -0.511, loss: 0.017  
i: 669, target: -0.663, output: -0.428, loss: 0.055  
i: 670, target: -1.306, output: -0.428, loss: 0.772  
i: 671, target: -1.985, output: -0.428, loss: 2.425  
i: 672, target: -0.796, output: -0.428, loss: 0.135  
i: 673, target: 9.428, output: -0.428, loss: 97.130  
i: 674, target: -0.602, output: -0.428, loss: 0.030  
i: 675, target: -0.749, output: -0.428, loss: 0.103  
i: 676, target: -1.041, output: -0.428, loss: 0.376  
i: 677, target: -2.646, output: -0.428, loss: 4.920  
i: 678, target: -2.141, output: -0.428, loss: 2.936  
i: 679, target: -0.945, output: -0.428, loss: 0.268  
i: 680, target: -0.362, output: -0.428, loss: 0.004  
i: 681, target: -1.439, output: -0.428, loss: 1.023  
i: 682, target: -1.026, output: -0.382, loss: 0.415  
i: 683, target: -1.304, output: -0.428, loss: 0.768  
i: 684, target: -2.129, output: -0.428, loss: 2.895

i: 685, target: -1.584, output: -0.428, loss: 1.337  
i: 686, target: -1.538, output: -0.428, loss: 1.233  
i: 687, target: -1.754, output: -0.428, loss: 1.758  
i: 688, target: -0.129, output: -0.428, loss: 0.089  
i: 689, target: -0.636, output: -0.428, loss: 0.044  
i: 690, target: -1.104, output: -0.428, loss: 0.458  
i: 691, target: -0.934, output: -0.428, loss: 0.256  
i: 692, target: -0.551, output: -0.428, loss: 0.015  
i: 693, target: -1.403, output: -0.428, loss: 0.951  
i: 694, target: -0.313, output: -0.428, loss: 0.013  
i: 695, target: -1.325, output: -0.428, loss: 0.805  
i: 696, target: -1.266, output: -0.428, loss: 0.702  
i: 697, target: 8.634, output: -0.428, loss: 82.111  
i: 698, target: -0.372, output: -0.428, loss: 0.003  
i: 699, target: -0.940, output: -0.428, loss: 0.262  
i: 700, target: -1.533, output: -0.428, loss: 1.222  
i: 701, target: -1.246, output: -0.428, loss: 0.669  
i: 702, target: -0.211, output: -0.428, loss: 0.047  
i: 703, target: -0.311, output: -0.428, loss: 0.014  
i: 704, target: -0.817, output: -0.428, loss: 0.151  
i: 705, target: -0.615, output: -0.428, loss: 0.035  
i: 706, target: -0.305, output: -0.428, loss: 0.015  
i: 707, target: -1.610, output: -0.428, loss: 1.397  
i: 708, target: -1.597, output: -0.428, loss: 1.367  
i: 709, target: -2.184, output: -0.428, loss: 3.084  
i: 710, target: -0.473, output: -0.428, loss: 0.002  
i: 711, target: -1.424, output: -0.428, loss: 0.992  
i: 712, target: -1.735, output: -0.428, loss: 1.710  
i: 713, target: -0.997, output: -0.428, loss: 0.324  
i: 714, target: -0.939, output: -0.428, loss: 0.261  
i: 715, target: -0.897, output: -0.428, loss: 0.220  
i: 716, target: -0.987, output: -0.428, loss: 0.313  
i: 717, target: -0.996, output: -0.428, loss: 0.323  
i: 718, target: -2.124, output: -0.428, loss: 2.876  
i: 719, target: -0.720, output: -0.428, loss: 0.085  
i: 720, target: -1.146, output: -0.428, loss: 0.516  
i: 721, target: -1.004, output: -0.428, loss: 0.332  
i: 722, target: -1.296, output: -0.428, loss: 0.753  
i: 723, target: -1.505, output: -0.428, loss: 1.161  
i: 724, target: -1.265, output: -0.428, loss: 0.701  
i: 725, target: -1.297, output: -0.428, loss: 0.756  
i: 726, target: -1.402, output: -0.428, loss: 0.949  
i: 727, target: -0.735, output: -0.428, loss: 0.094  
i: 728, target: -1.011, output: -0.428, loss: 0.340  
i: 729, target: -0.371, output: -0.428, loss: 0.003  
i: 730, target: -1.822, output: -0.428, loss: 1.944  
i: 731, target: -2.596, output: -0.428, loss: 4.700  
i: 732, target: -1.232, output: -0.428, loss: 0.647

i: 733, target: -0.738, output: -0.428, loss: 0.096  
i: 734, target: -1.480, output: -0.428, loss: 1.106  
i: 735, target: -1.634, output: -0.428, loss: 1.456  
i: 736, target: -1.350, output: -0.428, loss: 0.851  
i: 737, target: -0.847, output: -0.428, loss: 0.176  
i: 738, target: -1.081, output: -0.428, loss: 0.426  
i: 739, target: -0.543, output: -0.428, loss: 0.013  
i: 740, target: -0.806, output: -0.428, loss: 0.143  
i: 741, target: -1.580, output: -0.428, loss: 1.327  
i: 742, target: -1.161, output: -0.428, loss: 0.538  
i: 743, target: -0.609, output: -0.428, loss: 0.033  
i: 744, target: -0.697, output: -0.428, loss: 0.073  
i: 745, target: -1.102, output: -0.428, loss: 0.455  
i: 746, target: -1.178, output: -0.428, loss: 0.562  
i: 747, target: -0.929, output: -0.428, loss: 0.251  
i: 748, target: -0.265, output: -0.428, loss: 0.026  
i: 749, target: -0.603, output: -0.428, loss: 0.031  
i: 750, target: -1.355, output: -0.428, loss: 0.859  
i: 751, target: -0.673, output: -0.428, loss: 0.060  
i: 752, target: -0.851, output: -0.428, loss: 0.179  
i: 753, target: -1.274, output: -0.428, loss: 0.716  
i: 754, target: -0.738, output: -0.428, loss: 0.097  
i: 755, target: -0.706, output: -0.428, loss: 0.078  
i: 756, target: -0.468, output: -0.428, loss: 0.002  
i: 757, target: -0.715, output: -0.428, loss: 0.082  
i: 758, target: -0.597, output: -0.428, loss: 0.029  
i: 759, target: -0.755, output: -0.428, loss: 0.107  
i: 760, target: -1.452, output: -0.428, loss: 1.049  
i: 761, target: -0.552, output: -0.428, loss: 0.015  
i: 762, target: -2.566, output: -0.428, loss: 4.570  
i: 763, target: 9.802, output: -0.428, loss: 104.651  
i: 764, target: -0.481, output: -0.428, loss: 0.003  
i: 765, target: -0.890, output: -0.428, loss: 0.213  
i: 766, target: -2.110, output: -0.428, loss: 2.831  
i: 767, target: -0.596, output: -0.428, loss: 0.028  
i: 768, target: 8.967, output: -0.428, loss: 88.271  
i: 769, target: -1.239, output: -0.428, loss: 0.658  
i: 770, target: 9.842, output: -0.428, loss: 105.463  
i: 771, target: -1.934, output: -0.428, loss: 2.268  
i: 772, target: -1.714, output: -0.428, loss: 1.654  
i: 773, target: -0.462, output: -0.428, loss: 0.001  
i: 774, target: -0.611, output: -0.428, loss: 0.034  
i: 775, target: -0.762, output: -0.428, loss: 0.112  
i: 776, target: -1.758, output: -0.428, loss: 1.771  
i: 777, target: -0.230, output: -0.428, loss: 0.039  
i: 778, target: -0.555, output: -0.428, loss: 0.016  
i: 779, target: -0.930, output: -0.428, loss: 0.252  
i: 780, target: -1.303, output: -0.428, loss: 0.766

i: 781, target: -1.570, output: -0.428, loss: 1.305  
i: 782, target: -1.373, output: -0.428, loss: 0.894  
i: 783, target: 9.602, output: -0.428, loss: 100.593  
i: 784, target: -1.250, output: -0.428, loss: 0.677  
i: 785, target: 0.556, output: -0.428, loss: 0.968  
i: 786, target: -0.742, output: -0.428, loss: 0.099  
i: 787, target: -0.841, output: -0.428, loss: 0.171  
i: 788, target: -0.610, output: -0.428, loss: 0.033  
i: 789, target: -0.383, output: -0.428, loss: 0.002  
i: 790, target: -1.256, output: -0.428, loss: 0.686  
i: 791, target: 1.298, output: -0.428, loss: 2.979  
i: 792, target: -1.406, output: -0.428, loss: 0.957  
i: 793, target: -1.304, output: -0.428, loss: 0.767  
i: 794, target: -0.549, output: -0.428, loss: 0.015  
i: 795, target: -0.801, output: -0.428, loss: 0.140  
i: 796, target: -1.339, output: -0.428, loss: 0.830  
i: 797, target: -0.214, output: -0.428, loss: 0.046  
i: 798, target: -1.050, output: -0.428, loss: 0.387  
i: 799, target: -0.474, output: -0.428, loss: 0.002  
i: 800, target: -1.498, output: -0.428, loss: 1.146  
i: 801, target: -0.651, output: -0.428, loss: 0.050  
i: 802, target: -0.854, output: -0.428, loss: 0.182  
i: 803, target: -1.506, output: -0.428, loss: 1.162  
i: 804, target: -1.753, output: -0.428, loss: 1.757  
i: 805, target: -2.197, output: -0.428, loss: 3.131  
i: 806, target: -0.371, output: -0.428, loss: 0.003  
i: 807, target: -1.006, output: -0.428, loss: 0.334  
i: 808, target: -1.748, output: -0.428, loss: 1.743  
i: 809, target: -1.395, output: -0.428, loss: 0.936  
i: 810, target: 9.830, output: -0.428, loss: 105.220  
i: 811, target: -0.706, output: -0.428, loss: 0.077  
i: 812, target: -1.314, output: -0.428, loss: 0.786  
i: 813, target: -0.827, output: -0.428, loss: 0.159  
i: 814, target: -0.775, output: -0.428, loss: 0.120  
i: 815, target: -1.369, output: -0.428, loss: 0.886  
i: 816, target: -2.801, output: -0.428, loss: 5.633  
i: 817, target: -1.467, output: -0.428, loss: 1.079  
i: 818, target: -0.008, output: -0.428, loss: 0.176  
i: 819, target: 1.098, output: -0.428, loss: 2.327  
i: 820, target: -0.643, output: -0.428, loss: 0.046  
i: 821, target: -0.557, output: -0.428, loss: 0.017  
i: 822, target: 9.075, output: -0.428, loss: 90.295  
i: 823, target: -1.078, output: -0.428, loss: 0.423  
i: 824, target: -0.756, output: -0.428, loss: 0.108  
i: 825, target: 8.181, output: -0.428, loss: 74.103  
i: 826, target: -0.409, output: -0.428, loss: 0.000  
i: 827, target: -0.741, output: -0.428, loss: 0.098  
i: 828, target: -0.574, output: -0.428, loss: 0.021



i: 829, target: -0.700, output: -0.428, loss: 0.074  
i: 830, target: -1.029, output: -0.428, loss: 0.361  
i: 831, target: -1.366, output: -0.428, loss: 0.880  
i: 832, target: -0.521, output: -0.428, loss: 0.009  
i: 833, target: -0.507, output: -0.428, loss: 0.006  
i: 834, target: -1.086, output: -0.428, loss: 0.433  
i: 835, target: -0.406, output: -0.428, loss: 0.000  
i: 836, target: -0.730, output: -0.428, loss: 0.091  
i: 837, target: -0.072, output: -0.428, loss: 0.126  
i: 838, target: -1.133, output: -0.428, loss: 0.497  
i: 839, target: -0.522, output: -0.428, loss: 0.009  
i: 840, target: -0.701, output: -0.428, loss: 0.075  
i: 841, target: -1.024, output: -0.428, loss: 0.355  
i: 842, target: -1.057, output: -0.428, loss: 0.395  
i: 843, target: -0.514, output: -0.428, loss: 0.007  
i: 844, target: -0.301, output: -0.428, loss: 0.016  
i: 845, target: -0.567, output: -0.428, loss: 0.019  
i: 846, target: -1.292, output: -0.428, loss: 0.747  
i: 847, target: -1.736, output: -0.428, loss: 1.711  
i: 848, target: -2.753, output: -0.428, loss: 5.409  
i: 849, target: -0.743, output: -0.428, loss: 0.099  
i: 850, target: -0.386, output: -0.428, loss: 0.002  
i: 851, target: -0.959, output: -0.428, loss: 0.283  
i: 852, target: -0.343, output: -0.428, loss: 0.007  
i: 853, target: -2.471, output: -0.428, loss: 4.173  
i: 854, target: -1.119, output: -0.428, loss: 0.478  
i: 855, target: -1.933, output: -0.428, loss: 2.266  
i: 856, target: -1.302, output: -0.428, loss: 0.763  
i: 857, target: -0.654, output: -0.428, loss: 0.051  
i: 858, target: -2.146, output: -0.428, loss: 2.951  
i: 859, target: 0.357, output: -0.428, loss: 0.617  
i: 860, target: -0.617, output: -0.371, loss: 0.060  
i: 861, target: -0.600, output: -0.428, loss: 0.030  
i: 862, target: -2.440, output: -0.428, loss: 4.047  
i: 863, target: -1.331, output: -0.428, loss: 0.815  
i: 864, target: -0.628, output: -0.428, loss: 0.040  
i: 865, target: -1.996, output: -0.428, loss: 2.458  
i: 866, target: -1.219, output: -0.428, loss: 0.627  
i: 867, target: -1.843, output: -0.428, loss: 2.002  
i: 868, target: -0.304, output: -0.428, loss: 0.015  
i: 869, target: 0.541, output: -0.428, loss: 0.939  
i: 870, target: -0.665, output: -0.428, loss: 0.056  
i: 871, target: -0.967, output: -0.428, loss: 0.291  
i: 872, target: -1.241, output: -0.428, loss: 0.661  
i: 873, target: -0.717, output: -0.428, loss: 0.084  
i: 874, target: -1.246, output: -0.428, loss: 0.670  
i: 875, target: -0.422, output: -0.428, loss: 0.000  
i: 876, target: -0.676, output: -0.428, loss: 0.062

i: 877, target: -1.084, output: -0.428, loss: 0.430  
i: 878, target: -0.850, output: -0.428, loss: 0.178  
i: 879, target: -0.580, output: -0.428, loss: 0.023  
i: 880, target: -1.204, output: -0.428, loss: 0.603  
i: 881, target: -1.574, output: -0.428, loss: 1.313  
i: 882, target: -0.859, output: -0.428, loss: 0.186  
i: 883, target: -0.885, output: -0.428, loss: 0.209  
i: 884, target: -1.820, output: -0.428, loss: 1.939  
i: 885, target: -1.333, output: -0.428, loss: 0.820  
i: 886, target: -1.370, output: -0.428, loss: 0.888  
i: 887, target: -1.366, output: -0.428, loss: 0.879  
i: 888, target: -1.571, output: -0.428, loss: 1.307  
i: 889, target: -0.270, output: -0.428, loss: 0.025  
i: 890, target: -0.807, output: -0.428, loss: 0.144  
i: 891, target: -1.429, output: -0.428, loss: 1.003  
i: 892, target: 9.248, output: -0.428, loss: 93.629  
i: 893, target: -0.596, output: -0.428, loss: 0.028  
i: 894, target: -1.590, output: -0.428, loss: 1.350  
i: 895, target: -0.514, output: -0.428, loss: 0.007  
i: 896, target: -0.551, output: -0.428, loss: 0.015  
i: 897, target: -0.643, output: -0.428, loss: 0.046  
i: 898, target: -1.391, output: -0.428, loss: 0.928  
i: 899, target: 9.150, output: -0.428, loss: 91.741  
i: 900, target: -1.404, output: -0.428, loss: 0.953  
i: 901, target: -1.040, output: -0.428, loss: 0.375  
i: 902, target: -0.195, output: -0.428, loss: 0.054  
i: 903, target: -0.912, output: -0.428, loss: 0.234  
i: 904, target: 9.768, output: -0.428, loss: 103.951  
i: 905, target: -0.645, output: -0.428, loss: 0.047  
i: 906, target: 0.810, output: -0.428, loss: 1.533  
i: 907, target: 0.029, output: -0.428, loss: 0.209  
i: 908, target: -0.311, output: -0.428, loss: 0.014  
i: 909, target: 9.724, output: -0.428, loss: 103.058  
i: 910, target: -0.976, output: -0.428, loss: 0.301  
i: 911, target: -1.133, output: -0.428, loss: 0.498  
i: 912, target: -1.295, output: -0.428, loss: 0.753  
i: 913, target: -1.039, output: -0.428, loss: 0.373  
i: 914, target: -1.159, output: -0.428, loss: 0.535  
i: 915, target: -1.152, output: -0.428, loss: 0.525  
i: 916, target: -0.747, output: -0.428, loss: 0.102  
i: 917, target: 9.310, output: -0.428, loss: 94.833  
i: 918, target: 9.557, output: -0.428, loss: 99.689  
i: 919, target: -0.607, output: -0.428, loss: 0.032  
i: 920, target: -0.776, output: -0.428, loss: 0.121  
i: 921, target: -0.806, output: -0.428, loss: 0.143  
i: 922, target: -0.533, output: -0.428, loss: 0.011  
i: 923, target: 0.554, output: -0.428, loss: 0.965  
i: 924, target: 9.551, output: -0.428, loss: 99.580

i: 925, target: -1.276, output: -0.428, loss: 0.719  
i: 926, target: -1.200, output: -0.428, loss: 0.596  
i: 927, target: -1.184, output: -0.428, loss: 0.572  
i: 928, target: -1.483, output: -0.428, loss: 1.113  
i: 929, target: 8.742, output: -0.428, loss: 84.083  
i: 930, target: -1.648, output: -0.428, loss: 1.489  
i: 931, target: -1.227, output: -0.428, loss: 0.639  
i: 932, target: -0.360, output: -0.428, loss: 0.005  
i: 933, target: -1.395, output: -0.428, loss: 0.936  
i: 934, target: -0.666, output: -0.428, loss: 0.057  
i: 935, target: -0.927, output: -0.428, loss: 0.250  
i: 936, target: -0.546, output: -0.428, loss: 0.014  
i: 937, target: -1.620, output: -0.428, loss: 1.421  
i: 938, target: -1.172, output: -0.428, loss: 0.554  
i: 939, target: 0.329, output: -0.428, loss: 0.573  
i: 940, target: -0.433, output: -0.428, loss: 0.000  
i: 941, target: -0.255, output: -0.428, loss: 0.030  
i: 942, target: 8.324, output: -0.428, loss: 76.590  
i: 943, target: -1.396, output: -0.428, loss: 0.938  
i: 944, target: -0.872, output: -0.428, loss: 0.197  
i: 945, target: -0.313, output: -0.428, loss: 0.013  
i: 946, target: -0.489, output: -0.428, loss: 0.004  
i: 947, target: -0.168, output: -0.428, loss: 0.067  
i: 948, target: -0.986, output: -0.428, loss: 0.311  
i: 949, target: -1.169, output: -0.428, loss: 0.549  
i: 950, target: -0.524, output: -0.428, loss: 0.009  
i: 951, target: -1.567, output: -0.428, loss: 1.298  
i: 952, target: -1.493, output: -0.428, loss: 1.134  
i: 953, target: -0.387, output: -0.428, loss: 0.002  
i: 954, target: -0.366, output: -0.428, loss: 0.004  
i: 955, target: -0.606, output: -0.428, loss: 0.032  
i: 956, target: -0.465, output: -0.428, loss: 0.001  
i: 957, target: -0.909, output: -0.428, loss: 0.232  
i: 958, target: -0.632, output: -0.428, loss: 0.042  
i: 959, target: -0.455, output: -0.428, loss: 0.001  
i: 960, target: -1.198, output: -0.428, loss: 0.593  
i: 961, target: -1.110, output: -0.428, loss: 0.466  
i: 962, target: -1.345, output: -0.428, loss: 0.842  
i: 963, target: -0.810, output: -0.428, loss: 0.146  
i: 964, target: -0.615, output: -0.428, loss: 0.035  
i: 965, target: -0.802, output: -0.428, loss: 0.140  
i: 966, target: -0.672, output: -0.428, loss: 0.060  
i: 967, target: 9.480, output: -0.428, loss: 98.165  
i: 968, target: -0.325, output: -0.428, loss: 0.011  
i: 969, target: -1.265, output: -0.373, loss: 0.797  
i: 970, target: -0.499, output: -0.428, loss: 0.005  
i: 971, target: -0.844, output: -0.428, loss: 0.173  
i: 972, target: -1.908, output: -0.428, loss: 2.192

```

i: 973, target: -0.729, output: -0.428, loss: 0.091
i: 974, target: -0.814, output: -0.428, loss: 0.149
i: 975, target: -2.068, output: -0.428, loss: 2.689
i: 976, target: -0.985, output: -0.428, loss: 0.311
i: 977, target: -0.663, output: -0.428, loss: 0.056
i: 978, target: 9.143, output: -0.428, loss: 91.602
i: 979, target: -0.522, output: -0.428, loss: 0.009
i: 980, target: -0.897, output: -0.428, loss: 0.221
i: 981, target: -1.452, output: -0.428, loss: 1.049
i: 982, target: -2.264, output: -0.428, loss: 3.373
i: 983, target: -1.492, output: -0.428, loss: 1.133
i: 984, target: -0.784, output: -0.428, loss: 0.127
i: 985, target: -1.364, output: -0.428, loss: 0.876
i: 986, target: -0.509, output: -0.428, loss: 0.007
i: 987, target: -1.324, output: -0.428, loss: 0.804
i: 988, target: 9.708, output: -0.428, loss: 102.734
i: 989, target: -1.289, output: -0.428, loss: 0.741
i: 990, target: -0.371, output: -0.428, loss: 0.003
i: 991, target: -0.788, output: -0.428, loss: 0.130
i: 992, target: -1.463, output: -0.428, loss: 1.071
i: 993, target: -1.488, output: -0.428, loss: 1.124
i: 994, target: -0.471, output: -0.428, loss: 0.002
i: 995, target: -1.000, output: -0.428, loss: 0.328
i: 996, target: -0.564, output: -0.428, loss: 0.019
i: 997, target: -0.700, output: -0.428, loss: 0.074
i: 998, target: -1.765, output: -0.428, loss: 1.788
i: 999, target: -1.153, output: -0.428, loss: 0.527
Average loss: 5.374

```

## 4 Save the Notebook as a PDF

```

[21]: # SAVE THE NOTEBOOK

from IPython.display import Javascript

# Define the function to save the notebook
def save_notebook():
    display(Javascript('IPython.notebook.save_notebook()'))

# Call the save_notebook function to save the notebook
save_notebook()

```

<IPython.core.display.Javascript object>

```

[22]: import subprocess
import os

```

```

name_notebook = "0725-small_hybrid_model_1q_measurement.ipynb"

output_filename = "results/" + name_notebook[:4] + "/" + name_notebook[:-6] + "_0.
↳pdf"

#check if the output file already exists
while os.path.exists(output_filename):
    print("The file {} already exists".format(output_filename))
    output_filename = output_filename[:-5] + str(int(output_filename[-5]) + 1)
↳+ ".pdf"
    print("Trying to save the file as {}".format(output_filename))

subprocess.run(["jupyter", "nbconvert", "--to", "pdf", "--output",
↳output_filename, name_notebook])

```

[22]: CompletedProcess(args=['jupyter', 'nbconvert', '--to', 'pdf', '--output', 'results/0725/0725-small\_hybrid\_model\_1q\_measurement\_0.pdf', '0725-small\_hybrid\_model\_1q\_measurement.ipynb'], returncode=0)