

# 0724-small\_hybrid\_model\_v5

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]: def qml_RZZ(params, wires):
    """
    RZZ gate.
    """
```

```

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

```

```

[8]: import pennylane as qml

n_qubits = 4
n_layers_block = 50
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])

```

```

# rotations for each qubit
for j in range(n_qubits):
    qml.RX(weights[i,j,0], wires=j)
    qml.RZ(weights[i,j,1], wires=j)

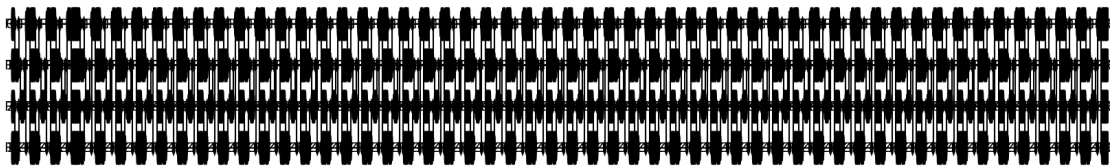
# measurement
return [qml.expval(qml.PauliZ(wires=i)) for i in range(n_qubits)]

```

```

[9]: 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))

```



```

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

```

```

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

```

### 3 Hybrid model

```

[12]: 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*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]
layers += [nn.Linear(input_dim*1, input_dim*1)]
layers += [nn.Linear(input_dim*1, input_dim*1), nn.ReLU()] * 2
layers += [nn.Linear(input_dim*1, 1)]
Net = nn.Sequential(*layers)

```

```

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

```

```

[14]: import time

```

```

[15]: # 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='\n')

```

```

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

```

```

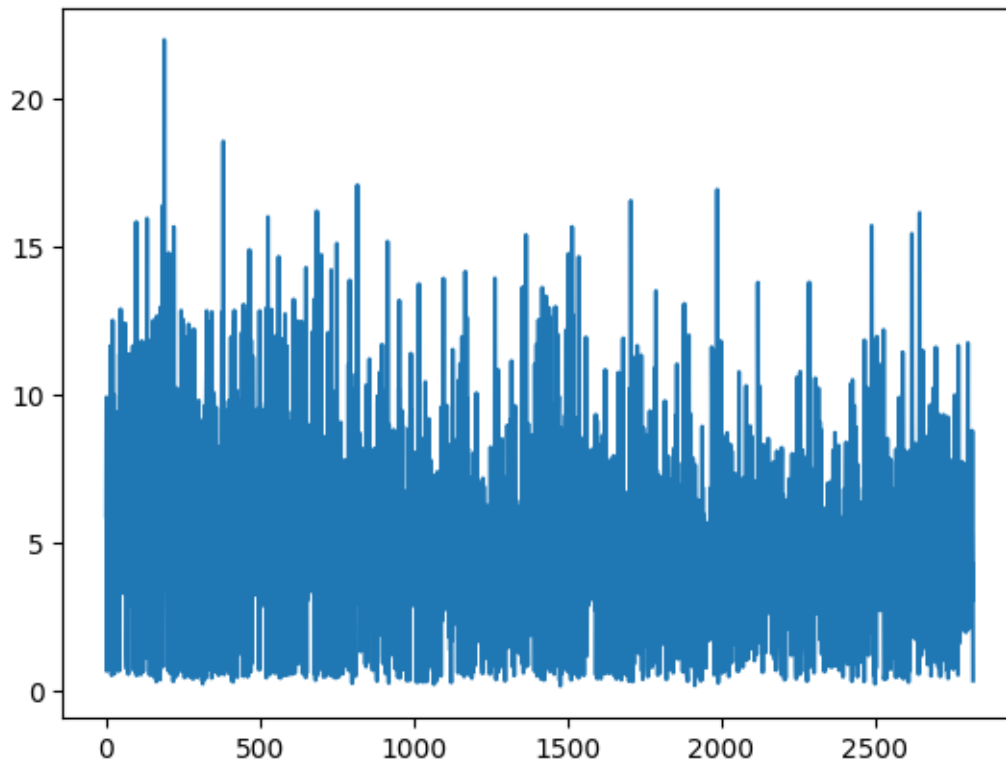
Epoch [1/10], Loss: 5.5833, Time remaining: ~0.0h 39.0m 51s
Epoch [2/10], Loss: 5.5736, Time remaining: ~0.0h 32.0m 52s
Epoch [3/10], Loss: 5.2027, Time remaining: ~0.0h 27.0m 57s
Epoch [4/10], Loss: 4.7908, Time remaining: ~0.0h 23.0m 37s
Epoch [5/10], Loss: 4.5980, Time remaining: ~0.0h 19.0m 29s
Epoch [6/10], Loss: 4.9970, Time remaining: ~0.0h 15.0m 28s
Epoch [7/10], Loss: 4.6958, Time remaining: ~0.0h 11.0m 32s
Epoch [8/10], Loss: 4.4876, Time remaining: ~0.0h 7.0m 40s
Epoch [9/10], Loss: 4.5569, Time remaining: ~0.0h 3.0m 49s
Epoch [10/10], Loss: 4.4384, Time remaining: ~0.0h 0.0m 0s

```

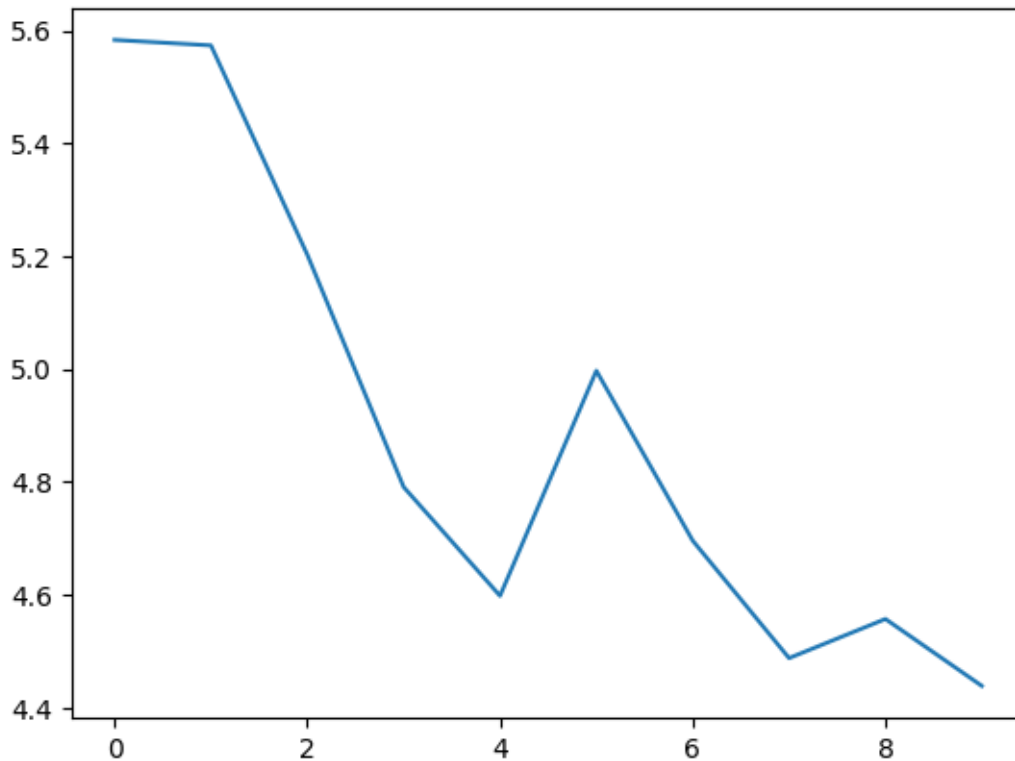
```

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

```



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



```
[18]: 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: {}, target: {:.3f}, output: {:.3f}, loss: {:.3f}'.format(x, t,
    ↪item(), model(i).item(), loss))
    print('')

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

i: 0, target: -2.038, output: -0.772, loss: 1.603

i: 1, target: -1.026, output: -1.263, loss: 0.056

i: 2, target: -1.715, output: -0.355, loss: 1.848

i: 3, target: -1.323, output: -1.183, loss: 0.020

i: 4, target: -1.600, output: -0.772, loss: 0.685

i: 5, target: 0.566, output: 2.341, loss: 3.153

i: 6, target: -1.281, output: -0.512, loss: 0.592  
i: 7, target: -0.574, output: -1.130, loss: 0.309  
i: 8, target: -1.425, output: -0.452, loss: 0.947  
i: 9, target: 0.183, output: 2.338, loss: 4.645  
i: 10, target: -0.438, output: -1.383, loss: 0.892  
i: 11, target: 0.266, output: -1.479, loss: 3.046  
i: 12, target: -0.515, output: -1.119, loss: 0.365  
i: 13, target: -1.352, output: -1.316, loss: 0.001  
i: 14, target: -1.248, output: 2.341, loss: 12.883  
i: 15, target: -1.726, output: -0.422, loss: 1.699  
i: 16, target: -1.765, output: -1.253, loss: 0.263  
i: 17, target: -0.564, output: -1.057, loss: 0.243  
i: 18, target: -0.334, output: -0.489, loss: 0.024  
i: 19, target: -0.890, output: -0.789, loss: 0.010  
i: 20, target: -1.495, output: -0.879, loss: 0.379  
i: 21, target: -0.574, output: -0.989, loss: 0.172  
i: 22, target: -0.090, output: 2.341, loss: 5.912  
i: 23, target: -0.168, output: -1.084, loss: 0.838  
i: 24, target: -2.089, output: -0.816, loss: 1.620  
i: 25, target: -2.053, output: 2.333, loss: 19.240  
i: 26, target: -0.940, output: -0.942, loss: 0.000  
i: 27, target: -0.635, output: -1.152, loss: 0.267  
i: 28, target: -1.295, output: -1.422, loss: 0.016  
i: 29, target: -0.659, output: -1.124, loss: 0.216



i: 30, target: -1.018, output: 2.341, loss: 11.283  
i: 31, target: -0.641, output: -0.702, loss: 0.004  
i: 32, target: -0.442, output: -0.320, loss: 0.015  
i: 33, target: -1.094, output: -1.033, loss: 0.004  
i: 34, target: -1.575, output: -0.818, loss: 0.574  
i: 35, target: -0.919, output: -1.150, loss: 0.053  
i: 36, target: -1.753, output: -1.032, loss: 0.520  
i: 37, target: -1.702, output: -1.036, loss: 0.444  
i: 38, target: -0.614, output: -1.325, loss: 0.505  
i: 39, target: -0.629, output: 1.337, loss: 3.866  
i: 40, target: -0.262, output: -0.279, loss: 0.000  
i: 41, target: -1.358, output: -0.968, loss: 0.152  
i: 42, target: -1.249, output: -1.041, loss: 0.043  
i: 43, target: -2.004, output: -1.331, loss: 0.453  
i: 44, target: -1.394, output: -0.520, loss: 0.764  
i: 45, target: -1.459, output: -1.029, loss: 0.184  
i: 46, target: -0.777, output: -1.194, loss: 0.174  
i: 47, target: -1.120, output: -1.073, loss: 0.002  
i: 48, target: -0.429, output: -0.579, loss: 0.023  
i: 49, target: -1.742, output: -0.115, loss: 2.646  
i: 50, target: -0.999, output: -0.986, loss: 0.000  
i: 51, target: -0.753, output: -0.594, loss: 0.025  
i: 52, target: -0.398, output: 2.326, loss: 7.423  
i: 53, target: -1.444, output: -1.494, loss: 0.002

i: 54, target: -1.792, output: -1.076, loss: 0.512  
i: 55, target: -0.905, output: -0.776, loss: 0.017  
i: 56, target: -0.643, output: -0.981, loss: 0.115  
i: 57, target: -0.539, output: -1.001, loss: 0.214  
i: 58, target: -0.789, output: 2.319, loss: 9.657  
i: 59, target: -1.127, output: -1.142, loss: 0.000  
i: 60, target: -1.492, output: -1.283, loss: 0.044  
i: 61, target: -2.039, output: -0.998, loss: 1.082  
i: 62, target: -0.327, output: -0.842, loss: 0.266  
i: 63, target: -1.026, output: 1.809, loss: 8.037  
i: 64, target: -1.886, output: -1.485, loss: 0.161  
i: 65, target: 0.648, output: 2.350, loss: 2.897  
i: 66, target: -0.737, output: -1.103, loss: 0.134  
i: 67, target: -1.685, output: -1.049, loss: 0.404  
i: 68, target: -1.369, output: -1.124, loss: 0.060  
i: 69, target: -1.589, output: 2.337, loss: 15.417  
i: 70, target: -0.462, output: -0.272, loss: 0.036  
i: 71, target: -0.672, output: -0.985, loss: 0.098  
i: 72, target: -0.538, output: -1.130, loss: 0.350  
i: 73, target: -0.622, output: -0.415, loss: 0.043  
i: 74, target: -1.289, output: -0.940, loss: 0.122  
i: 75, target: -0.583, output: -1.098, loss: 0.265  
i: 76, target: -0.868, output: -0.966, loss: 0.010  
i: 77, target: -0.750, output: 2.341, loss: 9.557

i: 78, target: -1.732, output: -0.743, loss: 0.977  
i: 79, target: -0.437, output: -1.170, loss: 0.537  
i: 80, target: -1.307, output: -1.106, loss: 0.040  
i: 81, target: -0.602, output: -1.194, loss: 0.350  
i: 82, target: -0.102, output: -1.373, loss: 1.616  
i: 83, target: -2.108, output: -1.043, loss: 1.133  
i: 84, target: -1.345, output: -1.082, loss: 0.069  
i: 85, target: -0.966, output: -1.415, loss: 0.202  
i: 86, target: -1.646, output: -1.283, loss: 0.132  
i: 87, target: 9.298, output: 2.341, loss: 48.387  
i: 88, target: 9.768, output: 2.341, loss: 55.150  
i: 89, target: -0.731, output: -1.233, loss: 0.252  
i: 90, target: -1.689, output: -0.781, loss: 0.824  
i: 91, target: -0.867, output: -0.551, loss: 0.100  
i: 92, target: -0.327, output: -0.842, loss: 0.266  
i: 93, target: -1.452, output: 0.630, loss: 4.334  
i: 94, target: -0.696, output: -0.730, loss: 0.001  
i: 95, target: -1.583, output: -1.215, loss: 0.135  
i: 96, target: -2.433, output: -1.328, loss: 1.221  
i: 97, target: -0.595, output: -1.127, loss: 0.283  
i: 98, target: -1.139, output: -1.176, loss: 0.001  
i: 99, target: -0.530, output: -0.933, loss: 0.162  
i: 100, target: -0.446, output: -1.429, loss: 0.965  
i: 101, target: -0.910, output: -0.856, loss: 0.003

i: 102, target: -1.188, output: -0.935, loss: 0.064  
i: 103, target: -0.767, output: -0.616, loss: 0.023  
i: 104, target: -2.706, output: -0.758, loss: 3.794  
i: 105, target: -1.169, output: -0.465, loss: 0.495  
i: 106, target: -1.224, output: -1.164, loss: 0.004  
i: 107, target: -1.072, output: -1.083, loss: 0.000  
i: 108, target: -0.861, output: -0.788, loss: 0.005  
i: 109, target: -0.352, output: -1.078, loss: 0.528  
i: 110, target: -2.004, output: -0.804, loss: 1.442  
i: 111, target: -0.954, output: -1.280, loss: 0.106  
i: 112, target: -0.885, output: -1.263, loss: 0.143  
i: 113, target: -1.069, output: -1.030, loss: 0.002  
i: 114, target: -0.115, output: -1.107, loss: 0.984  
i: 115, target: -0.918, output: -0.887, loss: 0.001  
i: 116, target: -0.833, output: -1.364, loss: 0.283  
i: 117, target: 0.840, output: 2.341, loss: 2.254  
i: 118, target: -0.738, output: -1.236, loss: 0.248  
i: 119, target: -0.722, output: -1.408, loss: 0.470  
i: 120, target: -0.516, output: -1.070, loss: 0.307  
i: 121, target: -1.185, output: -1.125, loss: 0.004  
i: 122, target: -0.599, output: -0.979, loss: 0.144  
i: 123, target: -0.749, output: -1.191, loss: 0.196  
i: 124, target: -1.366, output: -1.130, loss: 0.056  
i: 125, target: -1.023, output: -1.491, loss: 0.219

i: 126, target: -0.904, output: -0.822, loss: 0.007  
i: 127, target: -0.559, output: -1.220, loss: 0.437  
i: 128, target: -1.808, output: -0.891, loss: 0.840  
i: 129, target: -1.040, output: -1.033, loss: 0.000  
i: 130, target: -1.653, output: -1.211, loss: 0.195  
i: 131, target: -1.218, output: -0.950, loss: 0.072  
i: 132, target: -0.997, output: -1.458, loss: 0.212  
i: 133, target: -1.323, output: -1.034, loss: 0.083  
i: 134, target: -0.718, output: -0.950, loss: 0.054  
i: 135, target: -1.332, output: -0.979, loss: 0.124  
i: 136, target: -1.557, output: -1.194, loss: 0.132  
i: 137, target: -1.631, output: -1.493, loss: 0.019  
i: 138, target: -0.586, output: -1.064, loss: 0.229  
i: 139, target: -1.310, output: -1.185, loss: 0.016  
i: 140, target: -0.545, output: -0.798, loss: 0.064  
i: 141, target: 9.604, output: 2.342, loss: 52.742  
i: 142, target: 8.871, output: -0.748, loss: 92.526  
i: 143, target: -0.450, output: -0.432, loss: 0.000  
i: 144, target: -0.892, output: 2.344, loss: 10.472  
i: 145, target: -0.356, output: -1.089, loss: 0.536  
i: 146, target: -0.921, output: -1.058, loss: 0.019  
i: 147, target: -0.925, output: -1.143, loss: 0.048  
i: 148, target: -0.237, output: -1.123, loss: 0.785  
i: 149, target: -1.580, output: -1.145, loss: 0.189

i: 150, target: -0.841, output: -0.958, loss: 0.014  
i: 151, target: -1.432, output: -0.826, loss: 0.367  
i: 152, target: -0.671, output: -0.992, loss: 0.103  
i: 153, target: -1.271, output: -0.727, loss: 0.296  
i: 154, target: -1.163, output: -0.994, loss: 0.028  
i: 155, target: -1.032, output: -1.172, loss: 0.020  
i: 156, target: -0.916, output: -1.446, loss: 0.281  
i: 157, target: -2.029, output: -0.839, loss: 1.415  
i: 158, target: -0.706, output: -0.934, loss: 0.052  
i: 159, target: -2.026, output: -1.445, loss: 0.338  
i: 160, target: -1.286, output: -0.995, loss: 0.085  
i: 161, target: -1.992, output: -1.441, loss: 0.303  
i: 162, target: -0.662, output: -1.034, loss: 0.138  
i: 163, target: -0.729, output: -1.043, loss: 0.099  
i: 164, target: -0.657, output: -1.443, loss: 0.619  
i: 165, target: -0.464, output: -1.053, loss: 0.346  
i: 166, target: -0.822, output: 2.179, loss: 9.005  
i: 167, target: -0.731, output: -1.222, loss: 0.241  
i: 168, target: -2.414, output: -1.299, loss: 1.244  
i: 169, target: -1.323, output: -1.136, loss: 0.035  
i: 170, target: -0.621, output: -1.008, loss: 0.150  
i: 171, target: -1.137, output: -0.919, loss: 0.047  
i: 172, target: 9.206, output: 2.351, loss: 46.999  
i: 173, target: -1.599, output: -1.052, loss: 0.299

i: 174, target: -0.657, output: 2.325, loss: 8.892  
i: 175, target: -0.361, output: -1.124, loss: 0.583  
i: 176, target: -1.487, output: -1.120, loss: 0.134  
i: 177, target: -0.607, output: -0.577, loss: 0.001  
i: 178, target: -0.981, output: -1.194, loss: 0.045  
i: 179, target: -1.410, output: -0.288, loss: 1.259  
i: 180, target: -1.976, output: -0.819, loss: 1.340  
i: 181, target: -1.856, output: -1.100, loss: 0.571  
i: 182, target: -0.932, output: -1.031, loss: 0.010  
i: 183, target: -1.458, output: -0.346, loss: 1.235  
i: 184, target: -0.470, output: -0.499, loss: 0.001  
i: 185, target: -0.416, output: -1.057, loss: 0.411  
i: 186, target: -0.530, output: -1.151, loss: 0.385  
i: 187, target: -2.890, output: -1.194, loss: 2.874  
i: 188, target: -0.606, output: -1.044, loss: 0.192  
i: 189, target: -0.612, output: -0.935, loss: 0.104  
i: 190, target: -2.440, output: -1.374, loss: 1.138  
i: 191, target: -1.547, output: -1.125, loss: 0.178  
i: 192, target: -1.078, output: -1.469, loss: 0.153  
i: 193, target: -2.320, output: -0.972, loss: 1.818  
i: 194, target: 8.634, output: 1.581, loss: 49.741  
i: 195, target: 9.428, output: 2.334, loss: 50.321  
i: 196, target: 9.705, output: 2.346, loss: 54.146  
i: 197, target: 1.136, output: -0.948, loss: 4.343

i: 198, target: -1.206, output: -1.028, loss: 0.032  
i: 199, target: 9.484, output: 0.807, loss: 75.298  
i: 200, target: -1.097, output: -1.004, loss: 0.009  
i: 201, target: -1.624, output: -0.840, loss: 0.615  
i: 202, target: -0.819, output: -1.023, loss: 0.042  
i: 203, target: -1.381, output: -0.899, loss: 0.232  
i: 204, target: 0.435, output: 2.317, loss: 3.542  
i: 205, target: -0.486, output: -1.357, loss: 0.758  
i: 206, target: -0.219, output: -1.440, loss: 1.492  
i: 207, target: -0.986, output: -1.057, loss: 0.005  
i: 208, target: -1.082, output: -0.889, loss: 0.037  
i: 209, target: -0.920, output: 2.348, loss: 10.681  
i: 210, target: -1.007, output: 2.319, loss: 11.058  
i: 211, target: -1.244, output: -0.810, loss: 0.188  
i: 212, target: -1.051, output: -1.007, loss: 0.002  
i: 213, target: -0.927, output: -1.043, loss: 0.014  
i: 214, target: -0.399, output: -0.690, loss: 0.085  
i: 215, target: -1.155, output: -1.303, loss: 0.022  
i: 216, target: -0.616, output: -0.419, loss: 0.039  
i: 217, target: -1.285, output: -0.973, loss: 0.098  
i: 218, target: -0.788, output: -0.907, loss: 0.014  
i: 219, target: -1.003, output: -0.907, loss: 0.009  
i: 220, target: -0.852, output: -1.334, loss: 0.233  
i: 221, target: -0.001, output: -1.097, loss: 1.201



i: 222, target: -1.232, output: -1.044, loss: 0.035  
i: 223, target: -1.263, output: -1.045, loss: 0.047  
i: 224, target: -0.647, output: -0.277, loss: 0.136  
i: 225, target: -1.642, output: -0.826, loss: 0.666  
i: 226, target: -1.072, output: -0.922, loss: 0.022  
i: 227, target: -1.468, output: -1.282, loss: 0.034  
i: 228, target: -0.793, output: -1.034, loss: 0.058  
i: 229, target: -0.677, output: -0.434, loss: 0.059  
i: 230, target: -2.548, output: -0.850, loss: 2.886  
i: 231, target: -0.777, output: -1.194, loss: 0.174  
i: 232, target: -1.631, output: -1.052, loss: 0.335  
i: 233, target: -1.562, output: -0.949, loss: 0.376  
i: 234, target: -1.221, output: 1.154, loss: 5.640  
i: 235, target: -0.627, output: -1.032, loss: 0.164  
i: 236, target: -1.865, output: -1.088, loss: 0.603  
i: 237, target: -0.714, output: -0.551, loss: 0.026  
i: 238, target: -1.190, output: -1.133, loss: 0.003  
i: 239, target: -0.853, output: -0.994, loss: 0.020  
i: 240, target: 9.631, output: 0.633, loss: 80.962  
i: 241, target: -1.469, output: -1.021, loss: 0.201  
i: 242, target: -0.210, output: -1.083, loss: 0.763  
i: 243, target: -0.806, output: -0.328, loss: 0.229  
i: 244, target: -0.703, output: -0.504, loss: 0.040  
i: 245, target: -0.797, output: -1.491, loss: 0.481

i: 246, target: -1.304, output: -0.755, loss: 0.301  
i: 247, target: -1.189, output: -0.817, loss: 0.139  
i: 248, target: -1.309, output: -1.439, loss: 0.017  
i: 249, target: 0.710, output: 2.341, loss: 2.662  
i: 250, target: 9.218, output: 0.877, loss: 69.568  
i: 251, target: 0.029, output: -0.838, loss: 0.752  
i: 252, target: -1.809, output: -0.991, loss: 0.670  
i: 253, target: -1.368, output: -1.226, loss: 0.020  
i: 254, target: -1.098, output: -0.332, loss: 0.587  
i: 255, target: -1.359, output: -1.101, loss: 0.067  
i: 256, target: -0.635, output: -0.947, loss: 0.098  
i: 257, target: -1.282, output: -0.936, loss: 0.120  
i: 258, target: -2.226, output: -1.187, loss: 1.080  
i: 259, target: 9.921, output: 2.335, loss: 57.551  
i: 260, target: -0.782, output: -1.437, loss: 0.429  
i: 261, target: -0.555, output: -1.236, loss: 0.464  
i: 262, target: -0.948, output: -1.186, loss: 0.057  
i: 263, target: -0.737, output: 0.244, loss: 0.963  
i: 264, target: -1.059, output: -0.836, loss: 0.050  
i: 265, target: -0.344, output: 2.228, loss: 6.617  
i: 266, target: -0.614, output: -0.621, loss: 0.000  
i: 267, target: -0.771, output: -1.004, loss: 0.054  
i: 268, target: -0.737, output: -1.401, loss: 0.440  
i: 269, target: -1.952, output: -0.270, loss: 2.829

i: 270, target: -0.376, output: -0.984, loss: 0.370  
i: 271, target: -0.731, output: -0.896, loss: 0.027  
i: 272, target: -0.680, output: -1.040, loss: 0.130  
i: 273, target: 0.305, output: 1.801, loss: 2.238  
i: 274, target: -1.255, output: -0.455, loss: 0.640  
i: 275, target: -1.186, output: -0.862, loss: 0.105  
i: 276, target: -1.675, output: 2.342, loss: 16.143  
i: 277, target: -0.047, output: -0.504, loss: 0.209  
i: 278, target: -1.860, output: -0.990, loss: 0.757  
i: 279, target: -0.890, output: -0.909, loss: 0.000  
i: 280, target: -1.267, output: 2.341, loss: 13.024  
i: 281, target: -0.591, output: -0.578, loss: 0.000  
i: 282, target: -1.195, output: -1.354, loss: 0.026  
i: 283, target: -0.931, output: 2.248, loss: 10.107  
i: 284, target: -0.515, output: -1.355, loss: 0.705  
i: 285, target: 0.490, output: 1.720, loss: 1.513  
i: 286, target: -1.316, output: -1.047, loss: 0.073  
i: 287, target: -0.477, output: -0.330, loss: 0.022  
i: 288, target: -0.431, output: -0.366, loss: 0.004  
i: 289, target: -0.427, output: -1.361, loss: 0.872  
i: 290, target: -1.749, output: -0.431, loss: 1.736  
i: 291, target: -1.361, output: -0.921, loss: 0.193  
i: 292, target: -1.314, output: -0.974, loss: 0.116  
i: 293, target: -0.912, output: -1.470, loss: 0.311

i: 294, target: -1.621, output: -1.246, loss: 0.141  
i: 295, target: -0.787, output: -0.964, loss: 0.031  
i: 296, target: -0.583, output: -0.879, loss: 0.088  
i: 297, target: -0.610, output: -1.007, loss: 0.158  
i: 298, target: -0.372, output: -0.849, loss: 0.228  
i: 299, target: 9.755, output: -0.624, loss: 107.738  
i: 300, target: -0.692, output: -1.098, loss: 0.165  
i: 301, target: -1.041, output: -1.289, loss: 0.062  
i: 302, target: -0.665, output: -1.188, loss: 0.274  
i: 303, target: -0.686, output: -0.785, loss: 0.010  
i: 304, target: -1.425, output: -0.470, loss: 0.911  
i: 305, target: -0.902, output: -1.206, loss: 0.093  
i: 306, target: 0.163, output: 2.328, loss: 4.688  
i: 307, target: -2.189, output: -1.031, loss: 1.341  
i: 308, target: -0.645, output: 2.341, loss: 8.916  
i: 309, target: -0.663, output: 0.448, loss: 1.235  
i: 310, target: -0.290, output: -1.057, loss: 0.588  
i: 311, target: -0.702, output: -0.823, loss: 0.014  
i: 312, target: -1.304, output: -0.730, loss: 0.330  
i: 313, target: -0.759, output: -1.012, loss: 0.064  
i: 314, target: -1.480, output: 1.358, loss: 8.052  
i: 315, target: 9.069, output: -0.034, loss: 82.872  
i: 316, target: 0.008, output: 2.341, loss: 5.447  
i: 317, target: -1.367, output: -1.270, loss: 0.009

i: 318, target: -0.132, output: 2.345, loss: 6.138  
i: 319, target: -1.393, output: -0.447, loss: 0.894  
i: 320, target: -1.123, output: -1.063, loss: 0.004  
i: 321, target: -0.566, output: -1.101, loss: 0.286  
i: 322, target: -0.705, output: 1.938, loss: 6.986  
i: 323, target: -2.252, output: -1.001, loss: 1.565  
i: 324, target: -0.321, output: -1.194, loss: 0.762  
i: 325, target: -1.026, output: -0.829, loss: 0.039  
i: 326, target: -0.395, output: -0.471, loss: 0.006  
i: 327, target: -0.608, output: -1.199, loss: 0.349  
i: 328, target: -0.386, output: -1.056, loss: 0.448  
i: 329, target: -1.201, output: -0.941, loss: 0.068  
i: 330, target: -1.199, output: -1.075, loss: 0.015  
i: 331, target: -1.270, output: 2.341, loss: 13.046  
i: 332, target: -0.997, output: -0.288, loss: 0.502  
i: 333, target: 0.234, output: 2.337, loss: 4.426  
i: 334, target: -0.254, output: -0.402, loss: 0.022  
i: 335, target: -1.067, output: -1.188, loss: 0.015  
i: 336, target: 8.166, output: 2.341, loss: 33.929  
i: 337, target: 8.684, output: -0.091, loss: 77.001  
i: 338, target: -0.536, output: -1.037, loss: 0.252  
i: 339, target: -0.764, output: -1.025, loss: 0.068  
i: 340, target: -1.166, output: 2.326, loss: 12.197  
i: 341, target: -0.598, output: -1.068, loss: 0.221

i: 342, target: 8.981, output: 2.344, loss: 44.038  
i: 343, target: -1.344, output: -0.957, loss: 0.150  
i: 344, target: -1.158, output: -1.135, loss: 0.001  
i: 345, target: -0.240, output: 2.341, loss: 6.665  
i: 346, target: -1.198, output: -0.618, loss: 0.336  
i: 347, target: -0.909, output: -1.010, loss: 0.010  
i: 348, target: -0.766, output: -1.218, loss: 0.205  
i: 349, target: -1.071, output: -0.736, loss: 0.112  
i: 350, target: -1.417, output: -0.876, loss: 0.293  
i: 351, target: -1.057, output: -0.741, loss: 0.100  
i: 352, target: -1.378, output: -0.731, loss: 0.419  
i: 353, target: -1.655, output: -1.186, loss: 0.220  
i: 354, target: -1.313, output: -1.091, loss: 0.049  
i: 355, target: -1.043, output: -1.014, loss: 0.001  
i: 356, target: -1.698, output: -1.054, loss: 0.415  
i: 357, target: -0.827, output: -1.128, loss: 0.090  
i: 358, target: -0.867, output: -0.296, loss: 0.326  
i: 359, target: -1.169, output: -0.770, loss: 0.159  
i: 360, target: -0.706, output: -1.053, loss: 0.120  
i: 361, target: -1.646, output: -1.283, loss: 0.132  
i: 362, target: -1.314, output: -1.040, loss: 0.075  
i: 363, target: -0.897, output: -1.179, loss: 0.080  
i: 364, target: -1.188, output: -1.014, loss: 0.030  
i: 365, target: -1.180, output: -0.851, loss: 0.108

i: 366, target: -0.673, output: -0.981, loss: 0.095  
i: 367, target: -1.372, output: -1.079, loss: 0.086  
i: 368, target: -0.717, output: 2.337, loss: 9.331  
i: 369, target: -0.890, output: -0.276, loss: 0.377  
i: 370, target: -1.545, output: -0.576, loss: 0.939  
i: 371, target: -1.329, output: 2.331, loss: 13.394  
i: 372, target: -0.696, output: -0.730, loss: 0.001  
i: 373, target: -1.361, output: -0.959, loss: 0.161  
i: 374, target: -1.558, output: -0.773, loss: 0.616  
i: 375, target: -0.882, output: -1.192, loss: 0.096  
i: 376, target: -0.506, output: -0.609, loss: 0.011  
i: 377, target: -0.927, output: -1.048, loss: 0.015  
i: 378, target: -0.863, output: -1.484, loss: 0.385  
i: 379, target: -0.666, output: -0.727, loss: 0.004  
i: 380, target: -1.587, output: -1.307, loss: 0.078  
i: 381, target: -1.622, output: -1.147, loss: 0.226  
i: 382, target: -1.360, output: -1.092, loss: 0.072  
i: 383, target: -0.902, output: -1.016, loss: 0.013  
i: 384, target: -0.684, output: -0.347, loss: 0.114  
i: 385, target: -1.743, output: -0.941, loss: 0.643  
i: 386, target: -0.968, output: -1.051, loss: 0.007  
i: 387, target: -0.807, output: -1.187, loss: 0.144  
i: 388, target: -1.033, output: -0.914, loss: 0.014  
i: 389, target: -0.835, output: -1.022, loss: 0.035

i: 390, target: -0.558, output: 2.341, loss: 8.408  
i: 391, target: -0.716, output: -0.692, loss: 0.001  
i: 392, target: -1.169, output: -1.189, loss: 0.000  
i: 393, target: -0.428, output: -1.431, loss: 1.007  
i: 394, target: -0.678, output: -0.955, loss: 0.076  
i: 395, target: -0.945, output: -1.067, loss: 0.015  
i: 396, target: 0.055, output: 2.341, loss: 5.228  
i: 397, target: -0.958, output: -1.181, loss: 0.049  
i: 398, target: -1.323, output: -0.727, loss: 0.355  
i: 399, target: -1.325, output: -1.027, loss: 0.089  
i: 400, target: -0.877, output: -1.070, loss: 0.037  
i: 401, target: -0.529, output: -0.923, loss: 0.155  
i: 402, target: -1.571, output: -1.037, loss: 0.286  
i: 403, target: -0.664, output: -1.410, loss: 0.556  
i: 404, target: -2.002, output: -1.012, loss: 0.980  
i: 405, target: 9.842, output: 2.341, loss: 56.253  
i: 406, target: -0.624, output: -1.027, loss: 0.162  
i: 407, target: -1.276, output: -1.035, loss: 0.058  
i: 408, target: -1.538, output: -1.300, loss: 0.057  
i: 409, target: -0.724, output: -0.457, loss: 0.071  
i: 410, target: -0.616, output: -1.153, loss: 0.288  
i: 411, target: -0.679, output: -0.303, loss: 0.142  
i: 412, target: -0.663, output: -1.092, loss: 0.184  
i: 413, target: -1.366, output: -1.099, loss: 0.071



i: 414, target: 9.472, output: 2.341, loss: 50.847  
i: 415, target: -0.548, output: -1.110, loss: 0.315  
i: 416, target: -1.703, output: -1.299, loss: 0.164  
i: 417, target: -0.580, output: -1.057, loss: 0.228  
i: 418, target: -0.665, output: 2.341, loss: 9.038  
i: 419, target: -0.593, output: -1.243, loss: 0.422  
i: 420, target: -0.773, output: -1.004, loss: 0.054  
i: 421, target: -0.447, output: 1.663, loss: 4.454  
i: 422, target: -0.669, output: -1.334, loss: 0.443  
i: 423, target: -1.899, output: -0.737, loss: 1.350  
i: 424, target: -0.228, output: -1.186, loss: 0.917  
i: 425, target: -0.656, output: -1.490, loss: 0.697  
i: 426, target: -1.598, output: -1.319, loss: 0.078  
i: 427, target: 0.080, output: 2.341, loss: 5.115  
i: 428, target: -0.373, output: 2.051, loss: 5.875  
i: 429, target: -0.484, output: -0.353, loss: 0.017  
i: 430, target: 9.045, output: 2.341, loss: 44.934  
i: 431, target: -0.619, output: -0.277, loss: 0.117  
i: 432, target: -0.123, output: -0.837, loss: 0.510  
i: 433, target: -2.066, output: -1.041, loss: 1.051  
i: 434, target: -0.907, output: -1.058, loss: 0.023  
i: 435, target: -1.360, output: -0.900, loss: 0.212  
i: 436, target: -1.475, output: -0.309, loss: 1.358  
i: 437, target: -0.347, output: -1.031, loss: 0.468

i: 438, target: -1.687, output: -1.439, loss: 0.062  
i: 439, target: -2.816, output: -1.052, loss: 3.110  
i: 440, target: -1.574, output: -1.409, loss: 0.027  
i: 441, target: -0.312, output: -1.156, loss: 0.713  
i: 442, target: -1.048, output: -1.126, loss: 0.006  
i: 443, target: -1.009, output: -0.768, loss: 0.058  
i: 444, target: 0.271, output: 2.325, loss: 4.222  
i: 445, target: -1.729, output: -1.139, loss: 0.348  
i: 446, target: -1.076, output: -1.000, loss: 0.006  
i: 447, target: -0.560, output: 2.319, loss: 8.288  
i: 448, target: -0.366, output: 2.350, loss: 7.374  
i: 449, target: -1.413, output: 2.321, loss: 13.941  
i: 450, target: -1.590, output: -1.430, loss: 0.025  
i: 451, target: -2.365, output: -0.731, loss: 2.670  
i: 452, target: -2.131, output: -0.735, loss: 1.949  
i: 453, target: -1.781, output: -1.162, loss: 0.383  
i: 454, target: -0.743, output: -0.744, loss: 0.000  
i: 455, target: 9.618, output: -0.537, loss: 103.115  
i: 456, target: -2.974, output: -0.730, loss: 5.035  
i: 457, target: -0.862, output: -0.943, loss: 0.007  
i: 458, target: -0.755, output: -1.469, loss: 0.510  
i: 459, target: -0.160, output: -1.318, loss: 1.341  
i: 460, target: -1.162, output: -1.045, loss: 0.014  
i: 461, target: -0.777, output: -1.052, loss: 0.076

i: 462, target: -0.484, output: -1.212, loss: 0.531  
i: 463, target: 9.595, output: -0.664, loss: 105.247  
i: 464, target: -1.779, output: -1.051, loss: 0.530  
i: 465, target: -0.386, output: -1.056, loss: 0.448  
i: 466, target: -0.890, output: 0.140, loss: 1.060  
i: 467, target: -0.554, output: -1.044, loss: 0.240  
i: 468, target: -0.426, output: -0.342, loss: 0.007  
i: 469, target: -1.406, output: -1.030, loss: 0.141  
i: 470, target: -0.330, output: -0.591, loss: 0.068  
i: 471, target: -0.172, output: -1.136, loss: 0.929  
i: 472, target: -0.678, output: -0.421, loss: 0.066  
i: 473, target: -0.794, output: -1.110, loss: 0.100  
i: 474, target: -0.872, output: -1.196, loss: 0.105  
i: 475, target: -1.352, output: -0.854, loss: 0.248  
i: 476, target: -1.815, output: -1.171, loss: 0.415  
i: 477, target: 0.082, output: 2.341, loss: 5.103  
i: 478, target: -1.333, output: -1.021, loss: 0.098  
i: 479, target: -0.601, output: 2.341, loss: 8.656  
i: 480, target: -0.520, output: -1.095, loss: 0.330  
i: 481, target: -1.200, output: -0.954, loss: 0.060  
i: 482, target: -1.051, output: -1.174, loss: 0.015  
i: 483, target: -0.784, output: -1.039, loss: 0.065  
i: 484, target: -1.301, output: -1.048, loss: 0.064  
i: 485, target: -1.374, output: -1.467, loss: 0.009

i: 486, target: -0.829, output: -1.308, loss: 0.229  
i: 487, target: -1.010, output: -1.287, loss: 0.077  
i: 488, target: -2.222, output: 2.339, loss: 20.802  
i: 489, target: -1.070, output: -1.416, loss: 0.120  
i: 490, target: -0.639, output: 2.324, loss: 8.781  
i: 491, target: -2.197, output: -0.746, loss: 2.106  
i: 492, target: -0.633, output: -0.971, loss: 0.114  
i: 493, target: -1.462, output: -0.826, loss: 0.405  
i: 494, target: -1.714, output: -1.351, loss: 0.131  
i: 495, target: -0.528, output: -0.957, loss: 0.184  
i: 496, target: -0.740, output: -0.970, loss: 0.053  
i: 497, target: 9.492, output: 2.341, loss: 51.135  
i: 498, target: -0.783, output: -0.553, loss: 0.053  
i: 499, target: 9.586, output: 1.762, loss: 61.223  
i: 500, target: -1.463, output: -0.955, loss: 0.258  
i: 501, target: -1.519, output: -1.052, loss: 0.218  
i: 502, target: -0.276, output: -0.780, loss: 0.254  
i: 503, target: -0.575, output: -1.305, loss: 0.533  
i: 504, target: -1.870, output: -1.025, loss: 0.715  
i: 505, target: -0.802, output: -0.825, loss: 0.001  
i: 506, target: -0.571, output: 2.330, loss: 8.418  
i: 507, target: 1.134, output: -0.916, loss: 4.204  
i: 508, target: -1.800, output: -1.043, loss: 0.574  
i: 509, target: -1.310, output: -0.806, loss: 0.254

i: 510, target: -1.853, output: -1.199, loss: 0.427  
i: 511, target: 1.265, output: -0.931, loss: 4.824  
i: 512, target: -0.538, output: -0.822, loss: 0.081  
i: 513, target: -1.399, output: -0.840, loss: 0.312  
i: 514, target: -0.541, output: -1.442, loss: 0.811  
i: 515, target: -1.114, output: -0.998, loss: 0.014  
i: 516, target: -1.408, output: -1.006, loss: 0.162  
i: 517, target: 0.692, output: 2.323, loss: 2.662  
i: 518, target: -1.877, output: -0.978, loss: 0.808  
i: 519, target: -1.434, output: -1.307, loss: 0.016  
i: 520, target: -0.658, output: -1.135, loss: 0.228  
i: 521, target: -1.536, output: -0.726, loss: 0.655  
i: 522, target: -1.724, output: -1.152, loss: 0.327  
i: 523, target: -0.966, output: -0.466, loss: 0.250  
i: 524, target: -0.558, output: -1.039, loss: 0.232  
i: 525, target: -0.541, output: 0.463, loss: 1.008  
i: 526, target: -0.742, output: -1.402, loss: 0.436  
i: 527, target: 9.629, output: 1.918, loss: 59.457  
i: 528, target: -1.309, output: -1.325, loss: 0.000  
i: 529, target: 0.536, output: 2.341, loss: 3.259  
i: 530, target: -0.595, output: -1.138, loss: 0.295  
i: 531, target: -0.700, output: -0.833, loss: 0.018  
i: 532, target: -1.249, output: -1.186, loss: 0.004  
i: 533, target: -0.465, output: -1.054, loss: 0.346

i: 534, target: -2.106, output: -1.115, loss: 0.981  
i: 535, target: -0.339, output: -0.529, loss: 0.036  
i: 536, target: -1.201, output: -0.941, loss: 0.068  
i: 537, target: -0.420, output: -0.854, loss: 0.188  
i: 538, target: -0.946, output: -0.428, loss: 0.268  
i: 539, target: -1.553, output: -1.161, loss: 0.154  
i: 540, target: -0.577, output: -0.898, loss: 0.103  
i: 541, target: -0.577, output: -0.925, loss: 0.121  
i: 542, target: -0.134, output: -1.449, loss: 1.730  
i: 543, target: -0.442, output: 0.579, loss: 1.043  
i: 544, target: -1.651, output: -0.895, loss: 0.572  
i: 545, target: -0.927, output: -1.261, loss: 0.112  
i: 546, target: -1.430, output: -1.164, loss: 0.071  
i: 547, target: -2.450, output: -0.887, loss: 2.444  
i: 548, target: -1.648, output: -1.007, loss: 0.411  
i: 549, target: -0.803, output: -1.391, loss: 0.345  
i: 550, target: -0.595, output: -0.804, loss: 0.044  
i: 551, target: -1.968, output: -0.981, loss: 0.974  
i: 552, target: -1.414, output: -0.519, loss: 0.802  
i: 553, target: -0.664, output: -0.741, loss: 0.006  
i: 554, target: -1.206, output: -1.305, loss: 0.010  
i: 555, target: -1.407, output: -1.380, loss: 0.001  
i: 556, target: 0.595, output: 2.338, loss: 3.037  
i: 557, target: -2.166, output: -1.010, loss: 1.338

i: 558, target: -0.701, output: -1.401, loss: 0.490  
i: 559, target: -0.325, output: -1.066, loss: 0.549  
i: 560, target: -0.666, output: -0.791, loss: 0.016  
i: 561, target: -1.251, output: -1.049, loss: 0.041  
i: 562, target: -1.029, output: -1.032, loss: 0.000  
i: 563, target: -0.385, output: 2.313, loss: 7.282  
i: 564, target: -0.443, output: -1.153, loss: 0.504  
i: 565, target: -1.226, output: -0.772, loss: 0.206  
i: 566, target: 9.590, output: 2.334, loss: 52.649  
i: 567, target: -2.262, output: -1.042, loss: 1.489  
i: 568, target: -2.641, output: -1.022, loss: 2.621  
i: 569, target: -1.267, output: -0.985, loss: 0.080  
i: 570, target: -1.426, output: 2.311, loss: 13.966  
i: 571, target: -1.593, output: -0.920, loss: 0.453  
i: 572, target: -0.439, output: -1.305, loss: 0.751  
i: 573, target: -0.969, output: -0.995, loss: 0.001  
i: 574, target: -1.050, output: -1.460, loss: 0.168  
i: 575, target: -0.961, output: -0.370, loss: 0.349  
i: 576, target: -0.669, output: -1.060, loss: 0.152  
i: 577, target: -0.870, output: -0.882, loss: 0.000  
i: 578, target: -0.519, output: -0.977, loss: 0.210  
i: 579, target: -0.432, output: -1.099, loss: 0.445  
i: 580, target: 0.264, output: 2.314, loss: 4.202  
i: 581, target: -1.224, output: -0.703, loss: 0.271

i: 582, target: -0.800, output: -1.044, loss: 0.059  
i: 583, target: -1.748, output: -1.323, loss: 0.181  
i: 584, target: -0.823, output: -1.052, loss: 0.052  
i: 585, target: -0.678, output: -1.436, loss: 0.575  
i: 586, target: -1.351, output: -1.069, loss: 0.080  
i: 587, target: -1.309, output: -1.017, loss: 0.085  
i: 588, target: -1.367, output: -0.778, loss: 0.347  
i: 589, target: -0.704, output: -1.320, loss: 0.379  
i: 590, target: -0.557, output: -1.493, loss: 0.877  
i: 591, target: -1.117, output: 2.342, loss: 11.963  
i: 592, target: -1.932, output: -1.057, loss: 0.767  
i: 593, target: -0.648, output: -0.758, loss: 0.012  
i: 594, target: -1.238, output: -1.040, loss: 0.039  
i: 595, target: -0.406, output: -1.132, loss: 0.528  
i: 596, target: -0.822, output: -1.165, loss: 0.118  
i: 597, target: -0.368, output: -0.868, loss: 0.250  
i: 598, target: -1.727, output: -0.988, loss: 0.546  
i: 599, target: -1.468, output: -1.324, loss: 0.021  
i: 600, target: -0.783, output: -1.043, loss: 0.068  
i: 601, target: -0.406, output: 0.693, loss: 1.210  
i: 602, target: -1.892, output: -1.154, loss: 0.545  
i: 603, target: -0.820, output: -0.309, loss: 0.261  
i: 604, target: -1.397, output: -1.280, loss: 0.014  
i: 605, target: -1.104, output: -1.136, loss: 0.001



i: 606, target: -1.482, output: -1.130, loss: 0.124  
i: 607, target: -0.473, output: -0.809, loss: 0.113  
i: 608, target: -0.424, output: -0.861, loss: 0.191  
i: 609, target: -1.599, output: -0.778, loss: 0.675  
i: 610, target: -1.267, output: -0.638, loss: 0.396  
i: 611, target: -1.344, output: -0.947, loss: 0.157  
i: 612, target: -0.675, output: -1.191, loss: 0.266  
i: 613, target: -0.757, output: -0.442, loss: 0.099  
i: 614, target: -1.907, output: -0.967, loss: 0.884  
i: 615, target: -0.884, output: -0.403, loss: 0.231  
i: 616, target: -0.647, output: -1.069, loss: 0.178  
i: 617, target: -0.706, output: 2.335, loss: 9.246  
i: 618, target: -1.523, output: -1.383, loss: 0.020  
i: 619, target: -1.120, output: -0.726, loss: 0.155  
i: 620, target: -1.297, output: -0.971, loss: 0.106  
i: 621, target: -1.330, output: -1.007, loss: 0.104  
i: 622, target: -1.661, output: -0.273, loss: 1.925  
i: 623, target: 0.363, output: 2.333, loss: 3.881  
i: 624, target: -1.352, output: -1.431, loss: 0.006  
i: 625, target: -1.128, output: -1.192, loss: 0.004  
i: 626, target: -1.033, output: -1.076, loss: 0.002  
i: 627, target: 0.304, output: 2.341, loss: 4.149  
i: 628, target: -0.740, output: -1.094, loss: 0.126  
i: 629, target: -1.196, output: -0.813, loss: 0.147

i: 630, target: -0.512, output: -1.005, loss: 0.243  
i: 631, target: -1.054, output: -1.119, loss: 0.004  
i: 632, target: -0.673, output: -1.024, loss: 0.123  
i: 633, target: 9.351, output: 2.345, loss: 49.095  
i: 634, target: -0.444, output: -1.168, loss: 0.525  
i: 635, target: -1.659, output: -1.159, loss: 0.250  
i: 636, target: 9.610, output: -0.493, loss: 102.063  
i: 637, target: -1.202, output: -1.002, loss: 0.040  
i: 638, target: -0.425, output: -1.176, loss: 0.564  
i: 639, target: -0.468, output: -1.158, loss: 0.476  
i: 640, target: -0.810, output: -1.154, loss: 0.118  
i: 641, target: -0.826, output: -1.029, loss: 0.041  
i: 642, target: 0.763, output: 2.341, loss: 2.492  
i: 643, target: -1.164, output: -0.848, loss: 0.100  
i: 644, target: -0.605, output: 2.315, loss: 8.523  
i: 645, target: -1.021, output: -0.663, loss: 0.128  
i: 646, target: -0.869, output: -1.033, loss: 0.027  
i: 647, target: -0.757, output: -0.890, loss: 0.018  
i: 648, target: -0.968, output: -1.129, loss: 0.026  
i: 649, target: -1.446, output: -1.133, loss: 0.098  
i: 650, target: -1.479, output: -0.272, loss: 1.455  
i: 651, target: -1.311, output: -0.579, loss: 0.536  
i: 652, target: -1.706, output: -1.153, loss: 0.306  
i: 653, target: -0.805, output: -1.484, loss: 0.461

i: 654, target: -0.615, output: 1.527, loss: 4.587  
i: 655, target: -1.098, output: -1.042, loss: 0.003  
i: 656, target: -0.482, output: -1.100, loss: 0.381  
i: 657, target: -0.525, output: -1.014, loss: 0.239  
i: 658, target: 0.474, output: 2.341, loss: 3.487  
i: 659, target: -1.099, output: -1.099, loss: 0.000  
i: 660, target: -1.261, output: -0.988, loss: 0.074  
i: 661, target: -0.633, output: -1.261, loss: 0.394  
i: 662, target: -0.441, output: -0.914, loss: 0.224  
i: 663, target: -1.231, output: 2.341, loss: 12.760  
i: 664, target: -0.480, output: -0.920, loss: 0.193  
i: 665, target: -1.051, output: -0.927, loss: 0.015  
i: 666, target: 9.606, output: -0.956, loss: 111.562  
i: 667, target: -0.672, output: -1.034, loss: 0.131  
i: 668, target: -1.033, output: -1.486, loss: 0.205  
i: 669, target: -2.146, output: -0.590, loss: 2.421  
i: 670, target: -0.194, output: 2.319, loss: 6.317  
i: 671, target: -1.939, output: -0.864, loss: 1.154  
i: 672, target: -0.347, output: 2.322, loss: 7.123  
i: 673, target: -0.826, output: 1.349, loss: 4.733  
i: 674, target: -0.741, output: -1.159, loss: 0.174  
i: 675, target: -1.401, output: -0.890, loss: 0.261  
i: 676, target: -1.454, output: 1.940, loss: 11.518  
i: 677, target: -0.480, output: -1.194, loss: 0.510

i: 678, target: -0.447, output: -0.804, loss: 0.127  
i: 679, target: -2.073, output: -0.727, loss: 1.811  
i: 680, target: -0.527, output: -1.133, loss: 0.368  
i: 681, target: 8.976, output: 2.349, loss: 43.916  
i: 682, target: -0.462, output: -1.229, loss: 0.589  
i: 683, target: -2.009, output: -0.930, loss: 1.163  
i: 684, target: -0.589, output: -0.740, loss: 0.023  
i: 685, target: -1.028, output: -1.408, loss: 0.144  
i: 686, target: -1.071, output: -1.125, loss: 0.003  
i: 687, target: -0.908, output: -0.874, loss: 0.001  
i: 688, target: -0.613, output: -0.939, loss: 0.106  
i: 689, target: -1.898, output: -0.956, loss: 0.888  
i: 690, target: -0.935, output: 2.341, loss: 10.735  
i: 691, target: -0.855, output: -1.049, loss: 0.038  
i: 692, target: -1.261, output: -0.967, loss: 0.087  
i: 693, target: -1.282, output: -0.970, loss: 0.097  
i: 694, target: -1.337, output: -1.096, loss: 0.058  
i: 695, target: -1.724, output: -1.068, loss: 0.430  
i: 696, target: -1.412, output: -1.076, loss: 0.113  
i: 697, target: -0.475, output: -1.395, loss: 0.846  
i: 698, target: -0.100, output: -0.771, loss: 0.450  
i: 699, target: -1.201, output: -1.323, loss: 0.015  
i: 700, target: 0.600, output: 1.986, loss: 1.921  
i: 701, target: -1.451, output: -0.939, loss: 0.262

i: 702, target: -1.601, output: -0.786, loss: 0.665  
i: 703, target: -0.820, output: -1.053, loss: 0.054  
i: 704, target: -0.918, output: -0.755, loss: 0.027  
i: 705, target: -0.687, output: -0.802, loss: 0.013  
i: 706, target: -0.531, output: -1.154, loss: 0.388  
i: 707, target: -0.536, output: -1.074, loss: 0.290  
i: 708, target: 9.574, output: 2.339, loss: 52.341  
i: 709, target: -1.427, output: -0.727, loss: 0.491  
i: 710, target: -0.849, output: -0.964, loss: 0.013  
i: 711, target: -1.223, output: -0.837, loss: 0.149  
i: 712, target: -0.839, output: -0.316, loss: 0.274  
i: 713, target: -0.446, output: -1.451, loss: 1.009  
i: 714, target: -1.084, output: -1.109, loss: 0.001  
i: 715, target: -1.709, output: -1.439, loss: 0.073  
i: 716, target: -0.547, output: 1.124, loss: 2.790  
i: 717, target: -1.300, output: -0.816, loss: 0.235  
i: 718, target: -1.600, output: -0.937, loss: 0.439  
i: 719, target: -0.664, output: -1.063, loss: 0.160  
i: 720, target: -0.846, output: -0.987, loss: 0.020  
i: 721, target: -0.999, output: -1.492, loss: 0.244  
i: 722, target: -1.505, output: -1.302, loss: 0.041  
i: 723, target: -0.703, output: -1.201, loss: 0.248  
i: 724, target: -0.616, output: -0.600, loss: 0.000  
i: 725, target: -0.663, output: -0.943, loss: 0.078

i: 726, target: 8.324, output: 2.340, loss: 35.805  
i: 727, target: -0.235, output: -1.422, loss: 1.407  
i: 728, target: -1.136, output: -1.069, loss: 0.005  
i: 729, target: -0.726, output: -0.520, loss: 0.042  
i: 730, target: -1.126, output: -0.288, loss: 0.702  
i: 731, target: -0.874, output: -1.048, loss: 0.031  
i: 732, target: -0.406, output: -1.140, loss: 0.539  
i: 733, target: -1.294, output: -0.785, loss: 0.259  
i: 734, target: -0.738, output: -0.272, loss: 0.217  
i: 735, target: -1.230, output: -1.332, loss: 0.010  
i: 736, target: -0.593, output: -0.818, loss: 0.051  
i: 737, target: -0.965, output: -1.406, loss: 0.194  
i: 738, target: 1.175, output: 2.328, loss: 1.328  
i: 739, target: 0.750, output: 2.333, loss: 2.506  
i: 740, target: -0.442, output: 1.322, loss: 3.112  
i: 741, target: -0.917, output: -0.309, loss: 0.370  
i: 742, target: -0.653, output: -1.197, loss: 0.296  
i: 743, target: -1.695, output: -1.336, loss: 0.129  
i: 744, target: -0.701, output: -0.917, loss: 0.046  
i: 745, target: -0.462, output: 2.341, loss: 7.861  
i: 746, target: -0.475, output: -1.304, loss: 0.687  
i: 747, target: -1.566, output: -0.908, loss: 0.432  
i: 748, target: -0.789, output: -1.017, loss: 0.052  
i: 749, target: -0.777, output: -0.080, loss: 0.486

i: 750, target: -0.710, output: -1.064, loss: 0.125  
i: 751, target: -0.635, output: -1.141, loss: 0.257  
i: 752, target: -1.079, output: -1.192, loss: 0.013  
i: 753, target: -1.372, output: -1.412, loss: 0.002  
i: 754, target: 9.300, output: 2.343, loss: 48.413  
i: 755, target: 0.792, output: 2.347, loss: 2.417  
i: 756, target: -1.934, output: -0.959, loss: 0.950  
i: 757, target: -0.592, output: -0.793, loss: 0.040  
i: 758, target: -0.918, output: -1.084, loss: 0.028  
i: 759, target: -1.429, output: 0.737, loss: 4.690  
i: 760, target: -1.244, output: -0.810, loss: 0.188  
i: 761, target: -0.817, output: -1.463, loss: 0.418  
i: 762, target: -0.574, output: -1.381, loss: 0.652  
i: 763, target: -1.171, output: 2.340, loss: 12.323  
i: 764, target: -1.814, output: -1.049, loss: 0.585  
i: 765, target: 9.540, output: 2.323, loss: 52.081  
i: 766, target: 9.080, output: 2.341, loss: 45.410  
i: 767, target: -1.758, output: -0.897, loss: 0.743  
i: 768, target: -1.140, output: -1.055, loss: 0.007  
i: 769, target: -1.253, output: -0.952, loss: 0.090  
i: 770, target: -1.986, output: -0.805, loss: 1.395  
i: 771, target: -1.723, output: -0.938, loss: 0.616  
i: 772, target: 9.970, output: 1.098, loss: 78.710  
i: 773, target: -0.724, output: -1.123, loss: 0.159

i: 774, target: -1.055, output: -0.899, loss: 0.024  
i: 775, target: -0.595, output: 0.423, loss: 1.038  
i: 776, target: -0.594, output: 2.341, loss: 8.615  
i: 777, target: -1.016, output: -1.376, loss: 0.129  
i: 778, target: -0.054, output: -0.553, loss: 0.249  
i: 779, target: -1.983, output: -1.140, loss: 0.711  
i: 780, target: -0.910, output: -0.856, loss: 0.003  
i: 781, target: -1.033, output: 2.324, loss: 11.273  
i: 782, target: -1.146, output: -1.003, loss: 0.020  
i: 783, target: -0.255, output: -1.054, loss: 0.640  
i: 784, target: -0.878, output: -0.786, loss: 0.009  
i: 785, target: -0.680, output: -0.279, loss: 0.161  
i: 786, target: -0.473, output: 0.401, loss: 0.764  
i: 787, target: -0.389, output: -0.905, loss: 0.267  
i: 788, target: -1.211, output: -0.925, loss: 0.082  
i: 789, target: -1.072, output: -1.008, loss: 0.004  
i: 790, target: -0.030, output: 2.341, loss: 5.625  
i: 791, target: -1.956, output: -1.275, loss: 0.464  
i: 792, target: -0.430, output: -1.303, loss: 0.763  
i: 793, target: 9.109, output: -0.796, loss: 98.096  
i: 794, target: 0.676, output: 2.348, loss: 2.793  
i: 795, target: -1.225, output: -1.049, loss: 0.031  
i: 796, target: -0.590, output: -0.980, loss: 0.152  
i: 797, target: -1.648, output: -0.913, loss: 0.540



i: 798, target: -0.041, output: -1.174, loss: 1.285  
i: 799, target: -1.465, output: -1.104, loss: 0.130  
i: 800, target: -0.648, output: 2.341, loss: 8.935  
i: 801, target: -0.368, output: -0.282, loss: 0.007  
i: 802, target: -1.206, output: -1.492, loss: 0.082  
i: 803, target: -0.658, output: 1.913, loss: 6.610  
i: 804, target: -0.247, output: -1.134, loss: 0.787  
i: 805, target: -0.435, output: -1.342, loss: 0.823  
i: 806, target: -1.461, output: -0.871, loss: 0.347  
i: 807, target: -0.450, output: 2.342, loss: 7.793  
i: 808, target: -0.524, output: -1.334, loss: 0.656  
i: 809, target: -1.456, output: -0.510, loss: 0.896  
i: 810, target: -1.489, output: -1.031, loss: 0.210  
i: 811, target: -0.750, output: -0.285, loss: 0.216  
i: 812, target: -1.358, output: -0.197, loss: 1.347  
i: 813, target: -2.021, output: -0.374, loss: 2.714  
i: 814, target: 9.599, output: 2.341, loss: 52.673  
i: 815, target: -1.202, output: -1.432, loss: 0.053  
i: 816, target: -1.433, output: -1.021, loss: 0.169  
i: 817, target: -1.810, output: 2.121, loss: 15.452  
i: 818, target: -0.390, output: -1.344, loss: 0.909  
i: 819, target: -1.386, output: 2.315, loss: 13.701  
i: 820, target: -0.587, output: -0.803, loss: 0.047  
i: 821, target: -1.346, output: -1.198, loss: 0.022

i: 822, target: -0.527, output: -1.199, loss: 0.451  
i: 823, target: -1.377, output: -0.990, loss: 0.149  
i: 824, target: -0.813, output: -1.251, loss: 0.192  
i: 825, target: -1.291, output: -1.189, loss: 0.010  
i: 826, target: -0.599, output: -0.970, loss: 0.138  
i: 827, target: -0.855, output: -1.188, loss: 0.111  
i: 828, target: 8.834, output: 2.341, loss: 42.155  
i: 829, target: -0.659, output: -1.045, loss: 0.149  
i: 830, target: -0.944, output: -1.046, loss: 0.010  
i: 831, target: -0.731, output: -1.005, loss: 0.075  
i: 832, target: -0.331, output: -0.291, loss: 0.002  
i: 833, target: -0.705, output: -1.211, loss: 0.256  
i: 834, target: -0.454, output: -1.151, loss: 0.485  
i: 835, target: -0.945, output: -0.405, loss: 0.292  
i: 836, target: -1.217, output: 2.335, loss: 12.616  
i: 837, target: -1.177, output: 2.352, loss: 12.452  
i: 838, target: -0.649, output: -0.995, loss: 0.119  
i: 839, target: -0.077, output: 2.341, loss: 5.850  
i: 840, target: 0.363, output: 0.996, loss: 0.400  
i: 841, target: -0.636, output: 0.758, loss: 1.942  
i: 842, target: -1.661, output: 0.540, loss: 4.844  
i: 843, target: -0.385, output: -1.029, loss: 0.415  
i: 844, target: -1.729, output: -0.953, loss: 0.603  
i: 845, target: 0.645, output: 2.351, loss: 2.909

i: 846, target: -1.236, output: -1.486, loss: 0.063  
i: 847, target: -0.809, output: -0.859, loss: 0.003  
i: 848, target: -1.189, output: -0.862, loss: 0.107  
i: 849, target: -0.499, output: -0.476, loss: 0.001  
i: 850, target: -1.545, output: -1.380, loss: 0.027  
i: 851, target: -0.739, output: -0.967, loss: 0.052  
i: 852, target: -1.577, output: -0.661, loss: 0.838  
i: 853, target: -0.735, output: -1.068, loss: 0.111  
i: 854, target: -1.890, output: -1.098, loss: 0.629  
i: 855, target: -0.779, output: -1.432, loss: 0.426  
i: 856, target: -0.446, output: -1.100, loss: 0.428  
i: 857, target: -0.564, output: -1.158, loss: 0.353  
i: 858, target: 0.421, output: 2.341, loss: 3.687  
i: 859, target: -0.945, output: 2.333, loss: 10.746  
i: 860, target: -0.906, output: 0.366, loss: 1.619  
i: 861, target: -1.734, output: -1.004, loss: 0.533  
i: 862, target: -2.779, output: 2.330, loss: 26.102  
i: 863, target: -0.876, output: -0.290, loss: 0.344  
i: 864, target: -1.754, output: -0.877, loss: 0.768  
i: 865, target: -1.458, output: -1.217, loss: 0.058  
i: 866, target: -0.669, output: -0.823, loss: 0.024  
i: 867, target: -0.516, output: 0.583, loss: 1.207  
i: 868, target: -1.935, output: -1.045, loss: 0.792  
i: 869, target: -0.619, output: -1.134, loss: 0.266

i: 870, target: -1.191, output: -0.815, loss: 0.141  
i: 871, target: -0.854, output: -1.021, loss: 0.028  
i: 872, target: -1.285, output: -0.784, loss: 0.252  
i: 873, target: -1.436, output: -1.047, loss: 0.152  
i: 874, target: -0.466, output: -1.278, loss: 0.659  
i: 875, target: -1.366, output: -0.961, loss: 0.164  
i: 876, target: -1.728, output: -0.965, loss: 0.583  
i: 877, target: -1.247, output: -0.907, loss: 0.116  
i: 878, target: -0.846, output: -0.949, loss: 0.011  
i: 879, target: -0.850, output: -1.127, loss: 0.077  
i: 880, target: -0.405, output: -1.059, loss: 0.427  
i: 881, target: -0.602, output: -1.018, loss: 0.173  
i: 882, target: -0.655, output: -0.827, loss: 0.030  
i: 883, target: -1.376, output: -1.320, loss: 0.003  
i: 884, target: -0.540, output: -1.184, loss: 0.416  
i: 885, target: 0.060, output: 2.341, loss: 5.206  
i: 886, target: -1.190, output: -0.269, loss: 0.848  
i: 887, target: -0.314, output: -1.430, loss: 1.245  
i: 888, target: -1.531, output: -0.728, loss: 0.644  
i: 889, target: -1.369, output: -0.726, loss: 0.413  
i: 890, target: 0.034, output: -1.027, loss: 1.126  
i: 891, target: -0.134, output: 2.352, loss: 6.181  
i: 892, target: -1.945, output: -0.847, loss: 1.205  
i: 893, target: -1.771, output: -1.273, loss: 0.249

i: 894, target: -0.250, output: -1.093, loss: 0.711  
i: 895, target: -0.966, output: -1.148, loss: 0.033  
i: 896, target: -1.280, output: -0.271, loss: 1.018  
i: 897, target: -1.034, output: -1.180, loss: 0.021  
i: 898, target: -1.715, output: 2.069, loss: 14.316  
i: 899, target: -1.491, output: -1.194, loss: 0.088  
i: 900, target: -0.854, output: 0.776, loss: 2.658  
i: 901, target: -1.949, output: -1.389, loss: 0.314  
i: 902, target: -1.057, output: 2.341, loss: 11.553  
i: 903, target: -1.116, output: -0.817, loss: 0.089  
i: 904, target: -1.183, output: -1.334, loss: 0.023  
i: 905, target: -1.491, output: -0.816, loss: 0.456  
i: 906, target: -0.515, output: 2.343, loss: 8.167  
i: 907, target: -0.695, output: -1.038, loss: 0.118  
i: 908, target: -1.515, output: -0.796, loss: 0.518  
i: 909, target: -1.105, output: -0.441, loss: 0.440  
i: 910, target: -1.908, output: -0.992, loss: 0.840  
i: 911, target: -0.456, output: -1.141, loss: 0.469  
i: 912, target: -0.960, output: -1.088, loss: 0.017  
i: 913, target: -1.418, output: -0.271, loss: 1.314  
i: 914, target: -0.915, output: -1.097, loss: 0.033  
i: 915, target: -1.502, output: -0.430, loss: 1.148  
i: 916, target: -1.180, output: -1.094, loss: 0.007  
i: 917, target: 8.930, output: 2.352, loss: 43.273

i: 918, target: -1.474, output: -1.048, loss: 0.181  
i: 919, target: -1.175, output: -1.325, loss: 0.022  
i: 920, target: -1.050, output: -0.907, loss: 0.021  
i: 921, target: 0.001, output: -1.435, loss: 2.061  
i: 922, target: -1.195, output: -1.100, loss: 0.009  
i: 923, target: -0.710, output: -1.005, loss: 0.087  
i: 924, target: -1.595, output: -1.175, loss: 0.176  
i: 925, target: -0.646, output: -1.029, loss: 0.147  
i: 926, target: 9.724, output: 2.341, loss: 54.501  
i: 927, target: 0.584, output: 2.341, loss: 3.087  
i: 928, target: -1.503, output: -1.259, loss: 0.060  
i: 929, target: -1.882, output: -1.493, loss: 0.152  
i: 930, target: -0.542, output: -0.800, loss: 0.067  
i: 931, target: -0.552, output: -0.922, loss: 0.137  
i: 932, target: 0.291, output: 2.317, loss: 4.107  
i: 933, target: -2.530, output: -0.608, loss: 3.695  
i: 934, target: -0.886, output: -0.819, loss: 0.005  
i: 935, target: -1.426, output: -1.317, loss: 0.012  
i: 936, target: -0.690, output: 0.984, loss: 2.803  
i: 937, target: -2.019, output: -0.656, loss: 1.857  
i: 938, target: 9.368, output: 1.803, loss: 57.229  
i: 939, target: -1.087, output: -1.400, loss: 0.098  
i: 940, target: -0.549, output: -0.858, loss: 0.096  
i: 941, target: -1.516, output: -0.972, loss: 0.296

i: 942, target: -0.851, output: -0.669, loss: 0.033  
i: 943, target: -0.413, output: -1.096, loss: 0.466  
i: 944, target: -0.823, output: 2.351, loss: 10.071  
i: 945, target: -1.361, output: -0.962, loss: 0.159  
i: 946, target: -0.825, output: -1.160, loss: 0.112  
i: 947, target: -0.866, output: -1.479, loss: 0.376  
i: 948, target: -0.789, output: -0.828, loss: 0.002  
i: 949, target: -0.729, output: -0.777, loss: 0.002  
i: 950, target: -0.769, output: -1.355, loss: 0.343  
i: 951, target: -0.984, output: 2.341, loss: 11.062  
i: 952, target: -1.634, output: -0.931, loss: 0.495  
i: 953, target: -1.492, output: -0.997, loss: 0.245  
i: 954, target: 9.643, output: 2.341, loss: 53.312  
i: 955, target: -0.389, output: -1.163, loss: 0.599  
i: 956, target: -0.617, output: -0.814, loss: 0.039  
i: 957, target: -0.878, output: -1.286, loss: 0.166  
i: 958, target: -1.538, output: -1.065, loss: 0.224  
i: 959, target: -0.928, output: -0.557, loss: 0.138  
i: 960, target: -1.458, output: -0.535, loss: 0.853  
i: 961, target: -0.029, output: -1.376, loss: 1.814  
i: 962, target: -1.781, output: -1.300, loss: 0.231  
i: 963, target: -0.399, output: -0.894, loss: 0.245  
i: 964, target: -0.857, output: -1.073, loss: 0.046  
i: 965, target: 9.852, output: -0.834, loss: 114.195

i: 966, target: -1.606, output: -0.983, loss: 0.389  
i: 967, target: -2.262, output: -0.314, loss: 3.794  
i: 968, target: -0.789, output: -1.085, loss: 0.088  
i: 969, target: -0.753, output: -0.726, loss: 0.001  
i: 970, target: -0.502, output: -0.276, loss: 0.051  
i: 971, target: -1.294, output: -0.850, loss: 0.198  
i: 972, target: -0.504, output: -1.309, loss: 0.647  
i: 973, target: -0.547, output: -1.060, loss: 0.263  
i: 974, target: -0.761, output: -0.928, loss: 0.028  
i: 975, target: -0.461, output: -1.098, loss: 0.406  
i: 976, target: -1.026, output: -1.166, loss: 0.020  
i: 977, target: -0.533, output: -1.142, loss: 0.371  
i: 978, target: -0.711, output: -0.580, loss: 0.017  
i: 979, target: -0.765, output: -1.016, loss: 0.063  
i: 980, target: -1.418, output: -0.980, loss: 0.191  
i: 981, target: 0.442, output: 2.326, loss: 3.549  
i: 982, target: -0.817, output: -1.031, loss: 0.046  
i: 983, target: -0.604, output: -1.025, loss: 0.178  
i: 984, target: -0.794, output: 1.894, loss: 7.223  
i: 985, target: -0.748, output: -1.402, loss: 0.428  
i: 986, target: -1.636, output: -0.439, loss: 1.433  
i: 987, target: -0.913, output: -1.031, loss: 0.014  
i: 988, target: -0.766, output: -1.039, loss: 0.075  
i: 989, target: -1.024, output: -1.058, loss: 0.001



```
i: 990, target: -1.429, output: -1.041, loss: 0.150
i: 991, target: -1.028, output: -1.268, loss: 0.058
i: 992, target: -0.884, output: -1.033, loss: 0.022
i: 993, target: -0.684, output: -1.204, loss: 0.270
i: 994, target: -0.784, output: -1.057, loss: 0.074
i: 995, target: 9.093, output: 0.470, loss: 74.347
i: 996, target: -0.428, output: -1.265, loss: 0.701
i: 997, target: -0.955, output: -0.944, loss: 0.000
i: 998, target: -0.904, output: -1.251, loss: 0.120
i: 999, target: -0.422, output: -1.053, loss: 0.398

Average loss: 4.073
```

## 4 Save the Notebook as a PDF

```
[19]: # 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>

```
[20]: import subprocess
import os

name_notebook = "0724-small_hybrid_model_v5.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])

```

```

[20]: CompletedProcess(args=['jupyter', 'nbconvert', '--to', 'pdf', '--output',
'results/0724/0724-small_hybrid_model_v5_0.pdf',
'0724-small_hybrid_model_v5.ipynb'], returncode=0)

```