

# Regression\_v2

November 29, 2020

## 1 Regression

```
[29]: iterations = 10

k = 5
Ni = No = 1

for i in range(iterations):

    # choose hyperparams
    net_type = Net4

    Nh1 = np.random.choice(Nh1s)
    Nh2 = np.random.choice(Nh2s)
    Nh3 = np.random.choice(Nh3s)
    Nh4 = np.random.choice(Nh4s)
    activation_function = np.random.choice(activation_functions)
    net_params = [Ni, Nh1, Nh2, Nh3, Nh4, No, activation_function]

    optimizer_type = optim.Adam
    lr = np.random.choice(lrs)
    weight_decay = np.random.choice(weight_decays)
    optimizer_params = {'lr': lr, 'weight_decay': weight_decay}

    loss_function = nn.MSELoss()

    train_batch_size = int(np.random.choice(train_batch_sizes))

    evolver_type = Evolver_es
    patience = np.random.choice(patiences)
    evolver_additional_params = [patience]

    # K fold
    kf = KFoldCrossValidator(k, shuffle=True, all_train_df=all_train_df,
    ↪ net_type=net_type, net_params=net_params,
    ↪ optimizer_type=optimizer_type,
    ↪ optimizer_params=optimizer_params, loss_function=loss_function,
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        train_batch_size=train_batch_size,
        ⇨evolver_type=evolver_type,
        ⇨evolver_additional_params=evolver_additional_params)

    avg_train_loss, avg_val_loss = kf.run(10000)
    # avg_train_loss, avg_val_loss = 0,0

    df.loc[len(df)] = [Nh1,Nh2,Nh3,Nh4,activation_function,
        ⇨lr,weight_decay,train_batch_size,patience, avg_train_loss,avg_val_loss]
    df.to_csv('random_search.csv',index=False)
    files.download('random_search.csv')
    print(df.loc[len(df) - 1])

    idx = 0
    kf.evolvers[idx].plot_losses()
    kf.evolvers[idx].plot(kf.train_dfs[idx],kf.val_dfs[idx])

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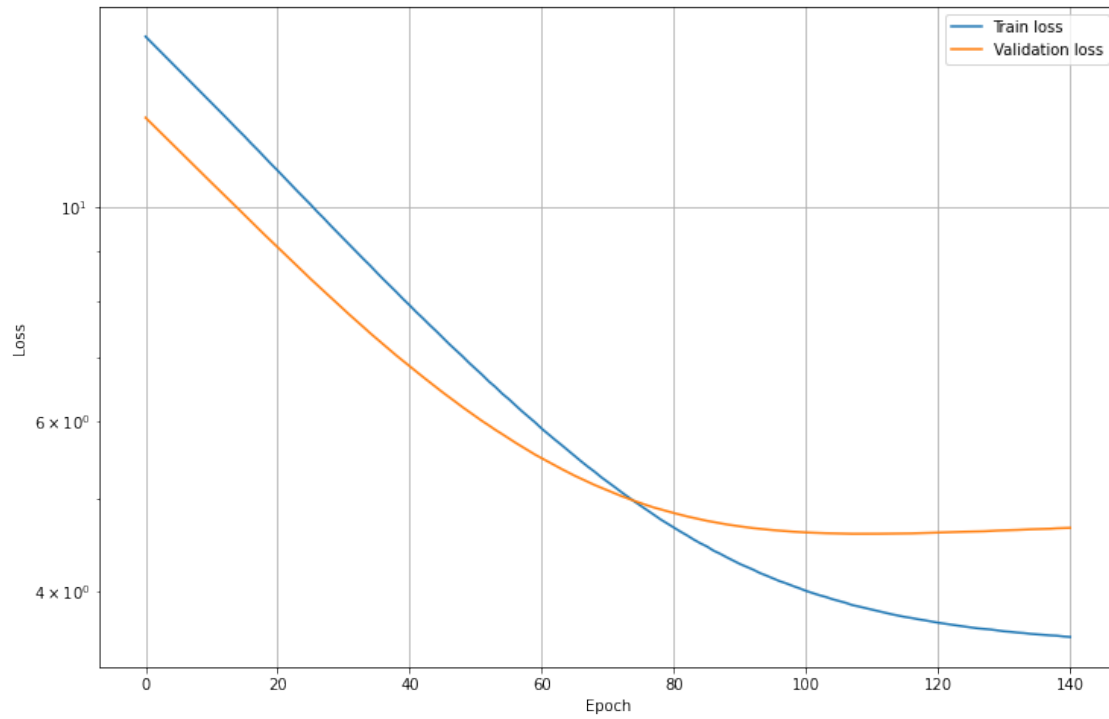
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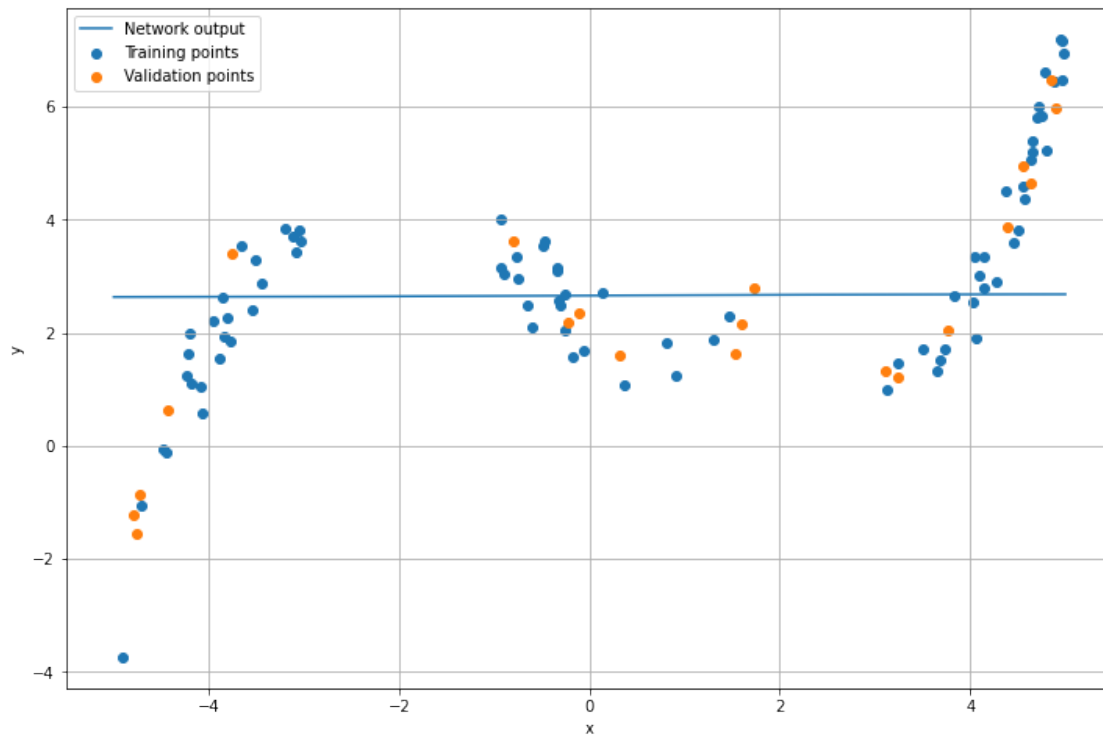
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Nh1	256
Nh2	128
Nh3	16
Nh4	64
activation_function	Sigmoid()
lr	0.0001
weight_decay	0.1

```
train_batch_size      10
patience              20
avg_train_loss        3.7912
avg_val_loss          3.76637
Name: 24, dtype: object
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Average train      loss in the last 10 epochs: 3.6133
Average validation loss in the last 10 epochs: 4.6456
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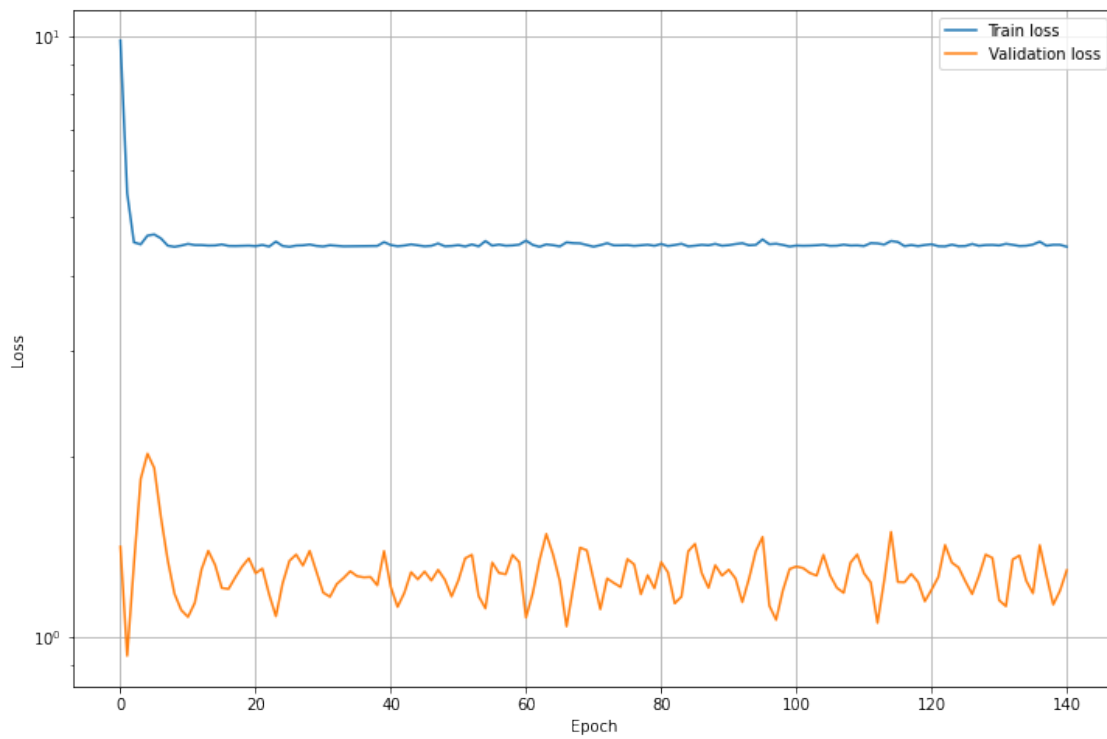
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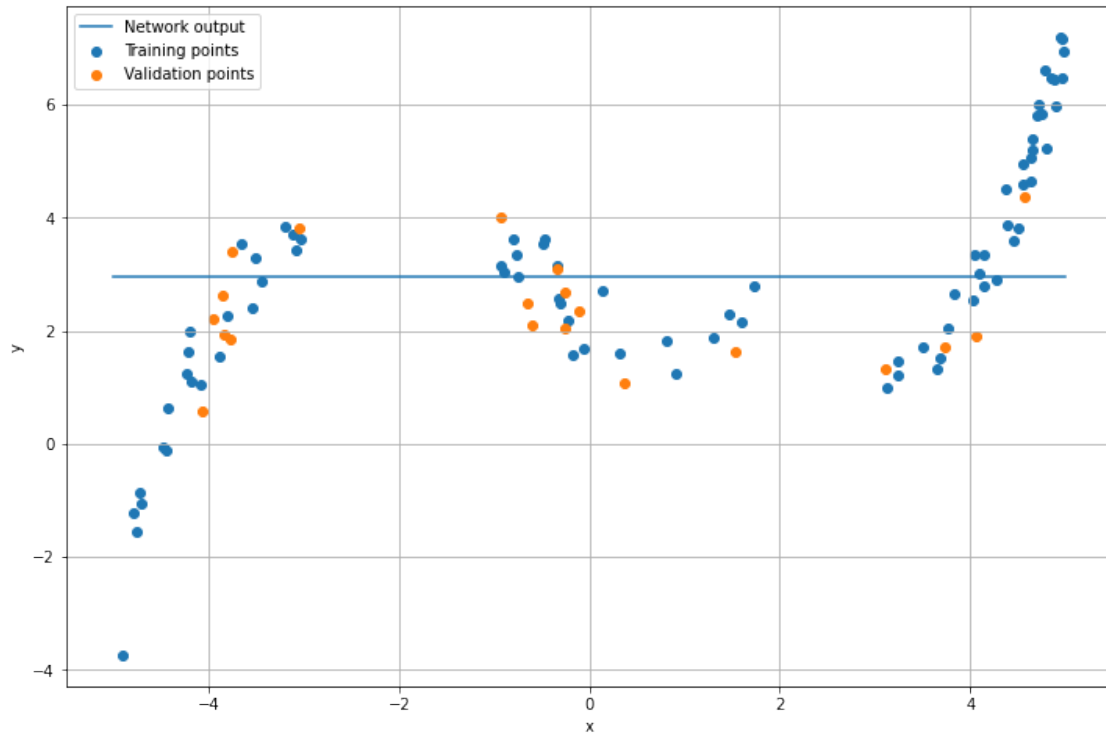
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Nh1 128  
Nh2 16  
Nh3 128  
Nh4 32  
activation\_function Sigmoid()  
lr 0.01  
weight\_decay 0.01  
train\_batch\_size 20  
patience 20  
avg\_train\_loss 3.83537  
avg\_val\_loss 3.87984  
Name: 25, dtype: object



Average train loss in the last 10 epochs: 4.4961  
Average validation loss in the last 10 epochs: 1.2585



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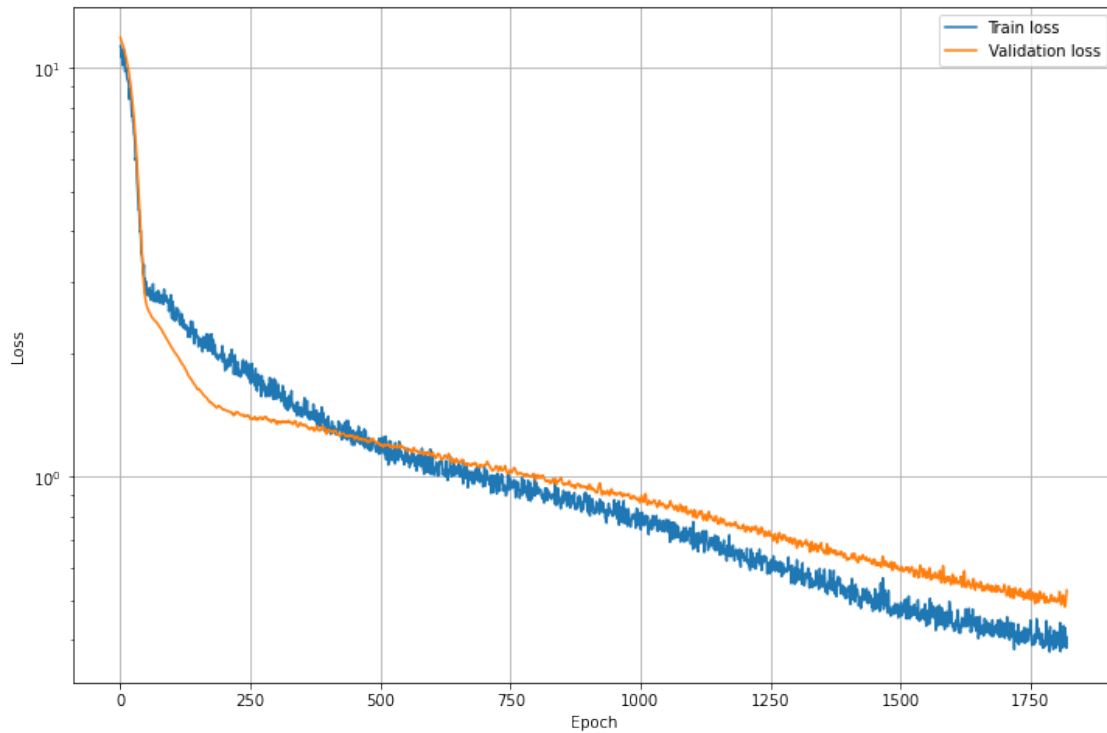
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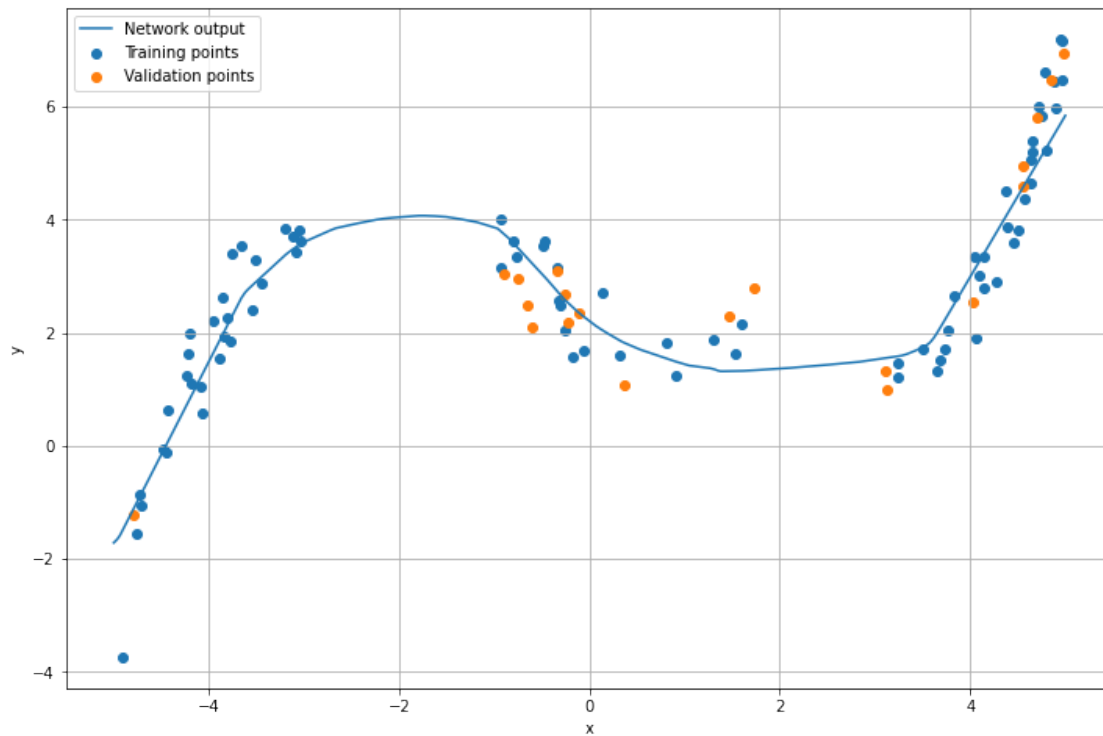
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Nh1 32  
Nh2 256  
Nh3 128  
Nh4 32  
activation\_function ReLU()  
lr 0.0001  
weight\_decay 0.1  
train\_batch\_size 30  
patience 20  
avg\_train\_loss 0.39294  
avg\_val\_loss 0.483314  
Name: 26, dtype: object



Average train loss in the last 10 epochs: 0.4082  
Average validation loss in the last 10 epochs: 0.5013



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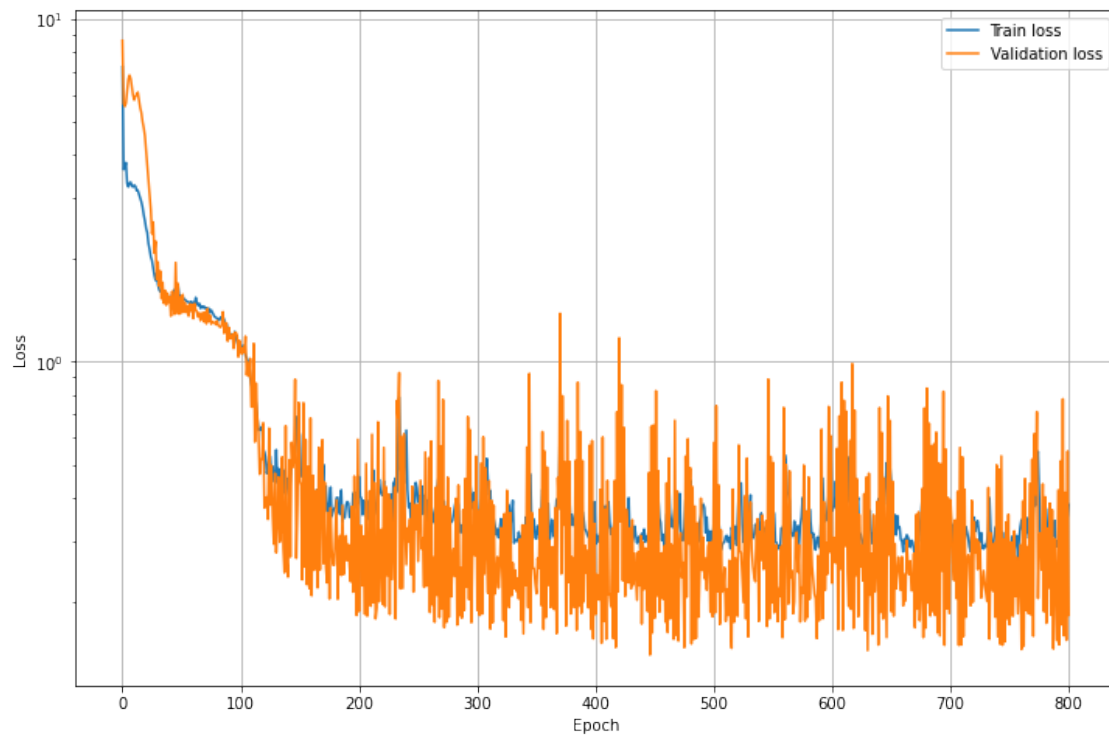
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Nh1                64
Nh2                16
Nh3                16
Nh4                64
activation_function  Sigmoid()
lr                 0.01
weight_decay       0.001
train_batch_size   20
patience          200
avg_train_loss     0.47388
avg_val_loss       0.982342
Name: 27, dtype: object

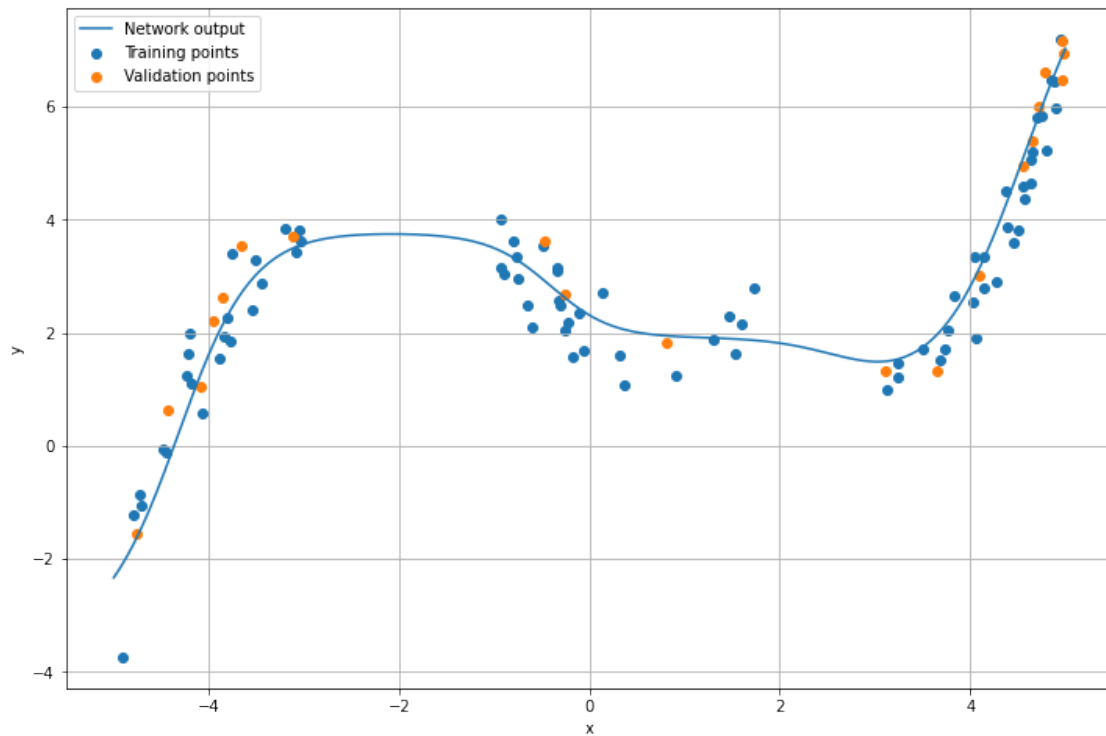
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Average train      loss in the last 10 epochs: 0.3495
Average validation loss in the last 10 epochs: 0.3493

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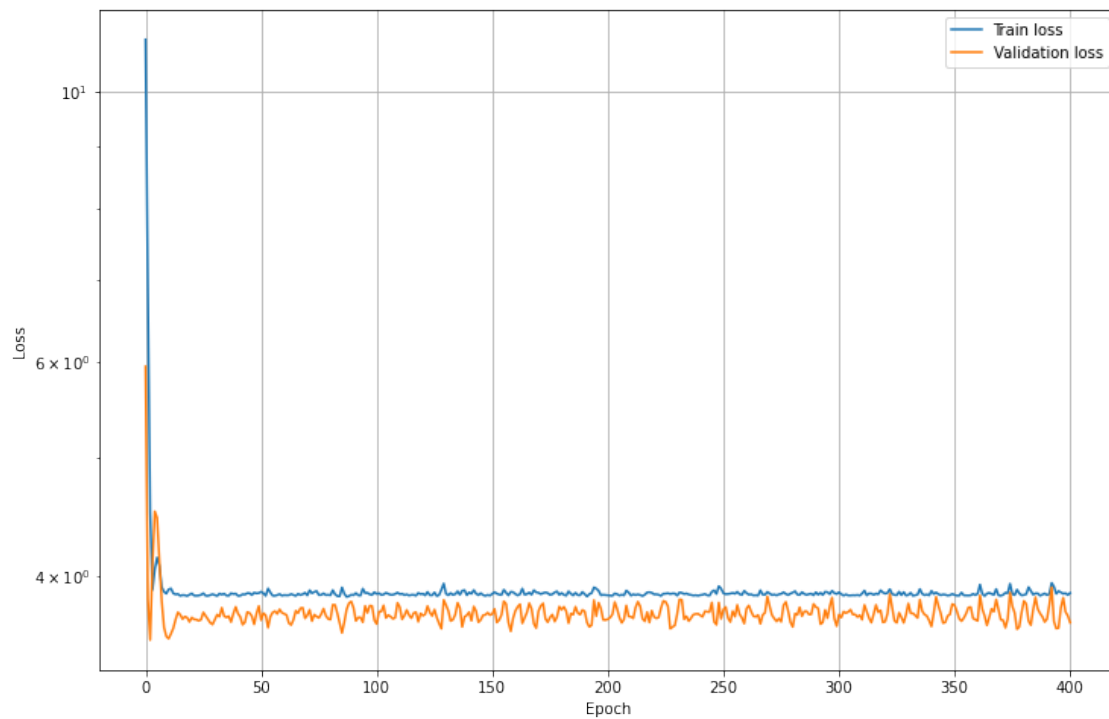
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Nh1                64
Nh2                64
Nh3               128
Nh4               256
activation_function  Sigmoid()
lr                 0.001
weight_decay       0.1
train_batch_size   20
patience          200
avg_train_loss     3.82774
avg_val_loss       3.89406
Name: 28, dtype: object

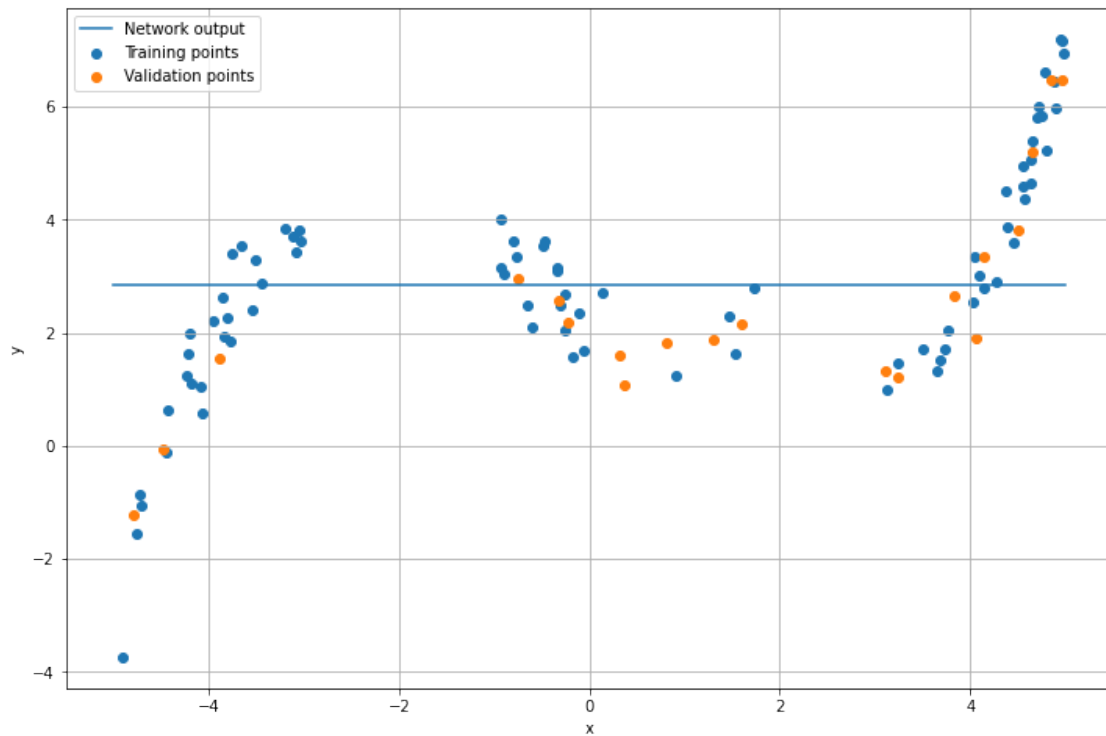
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Average train      loss in the last 10 epochs: 3.8809
Average validation loss in the last 10 epochs: 3.7310

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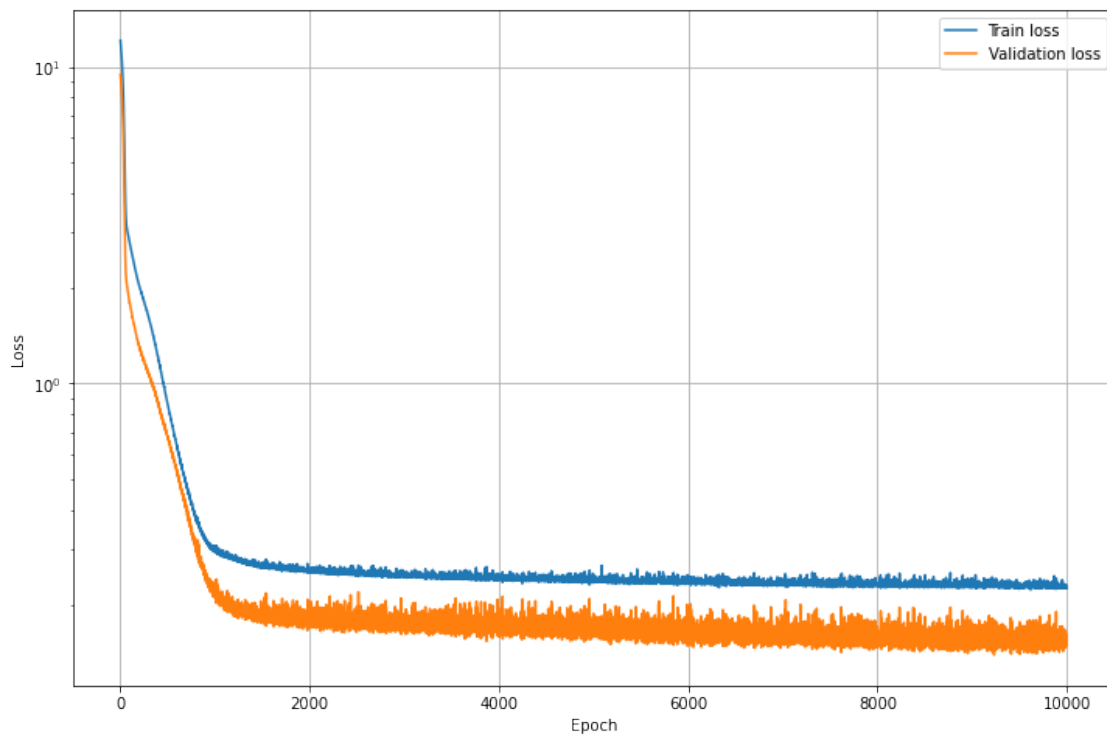
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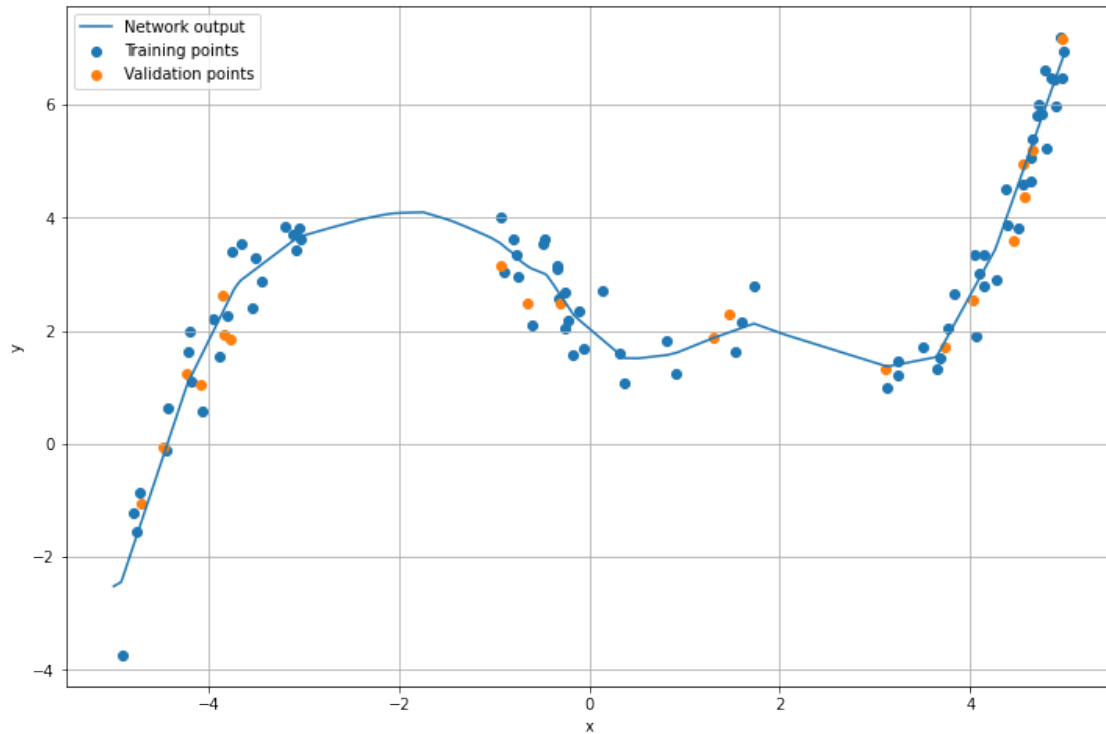
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Nh1 32  
Nh2 256  
Nh3 16  
Nh4 32  
activation\_function ReLU()  
lr 0.0001  
weight\_decay 0.01  
train\_batch\_size 20  
patience 500  
avg\_train\_loss 0.214284  
avg\_val\_loss 0.319568  
Name: 29, dtype: object



Average train loss in the last 10 epochs: 0.2278  
Average validation loss in the last 10 epochs: 0.1536



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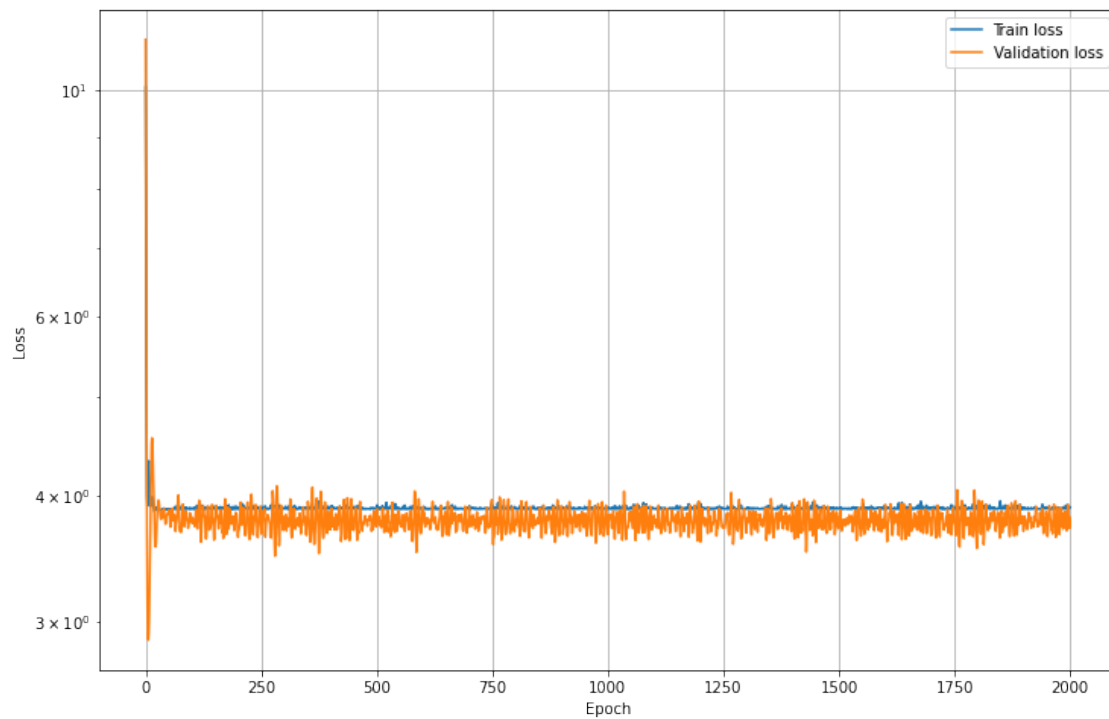
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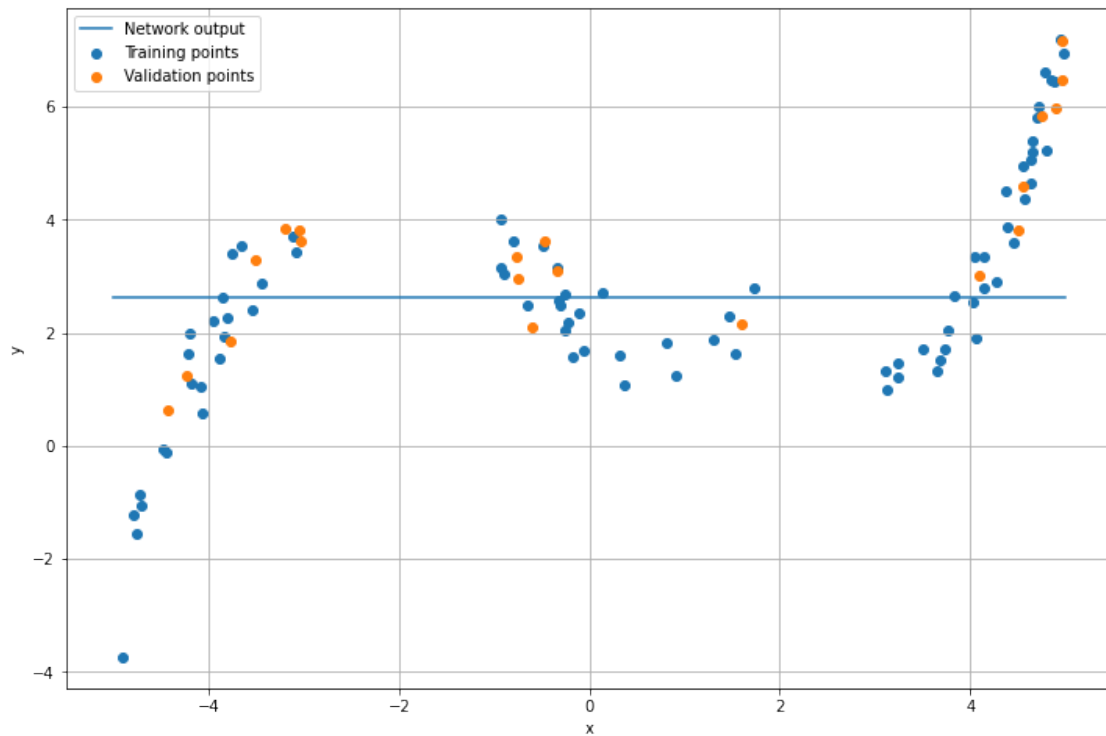
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Nh1 16  
Nh2 256  
Nh3 256  
Nh4 256  
activation\_function Sigmoid()  
lr 0.001  
weight\_decay 0.1  
train\_batch\_size 40  
patience 500  
avg\_train\_loss 3.80294  
avg\_val\_loss 4.00213  
Name: 30, dtype: object



Average train loss in the last 10 epochs: 3.8880  
Average validation loss in the last 10 epochs: 3.7758



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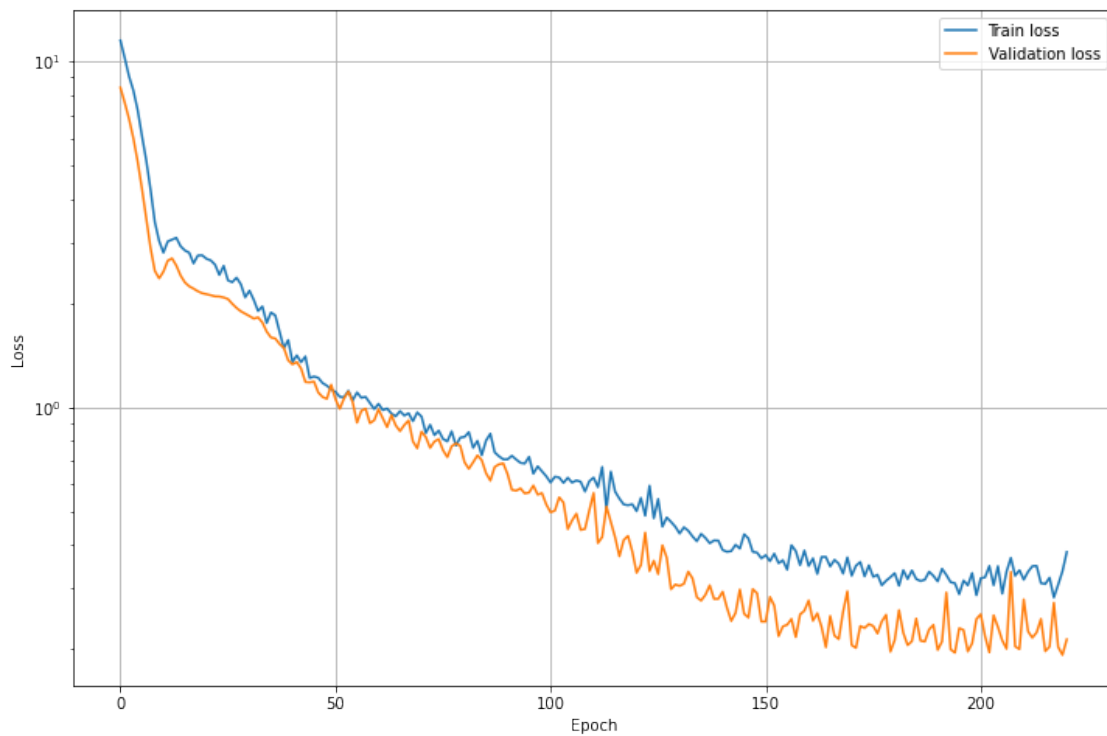
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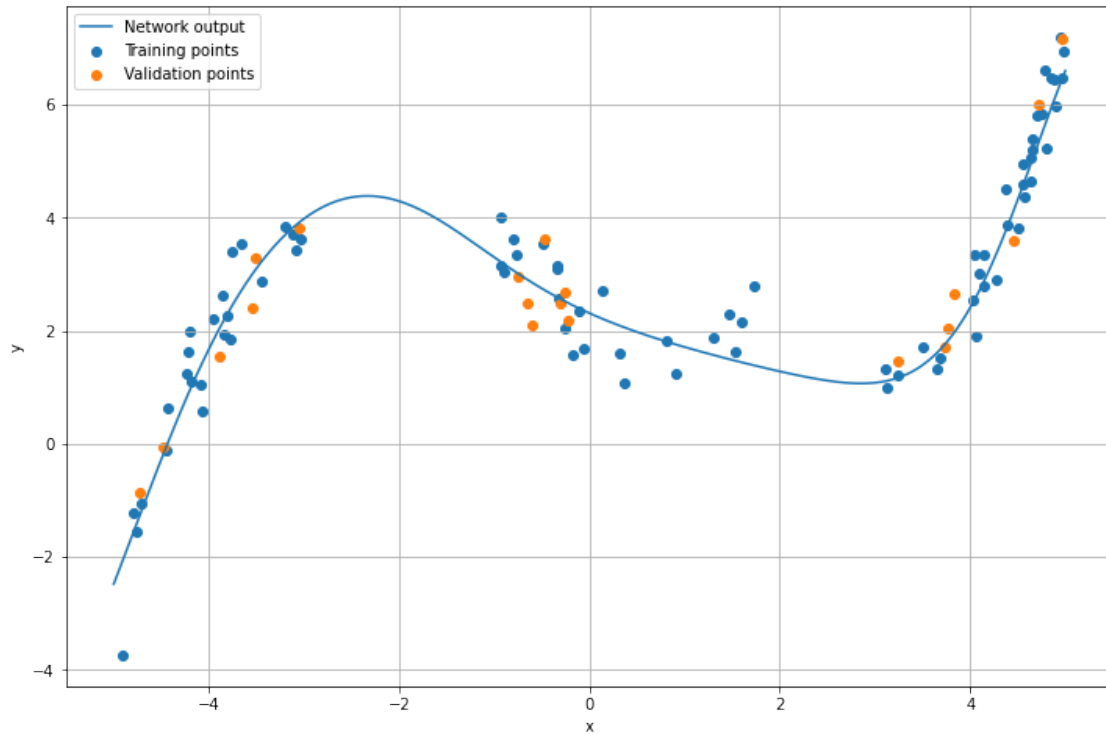
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Nh1 64  
Nh2 16  
Nh3 32  
Nh4 128  
activation\_function Tanh()  
lr 0.001  
weight\_decay 0.01  
train\_batch\_size 30  
patience 20  
avg\_train\_loss 0.299173  
avg\_val\_loss 0.376115  
Name: 31, dtype: object



Average train loss in the last 10 epochs: 0.3272  
Average validation loss in the last 10 epochs: 0.2185



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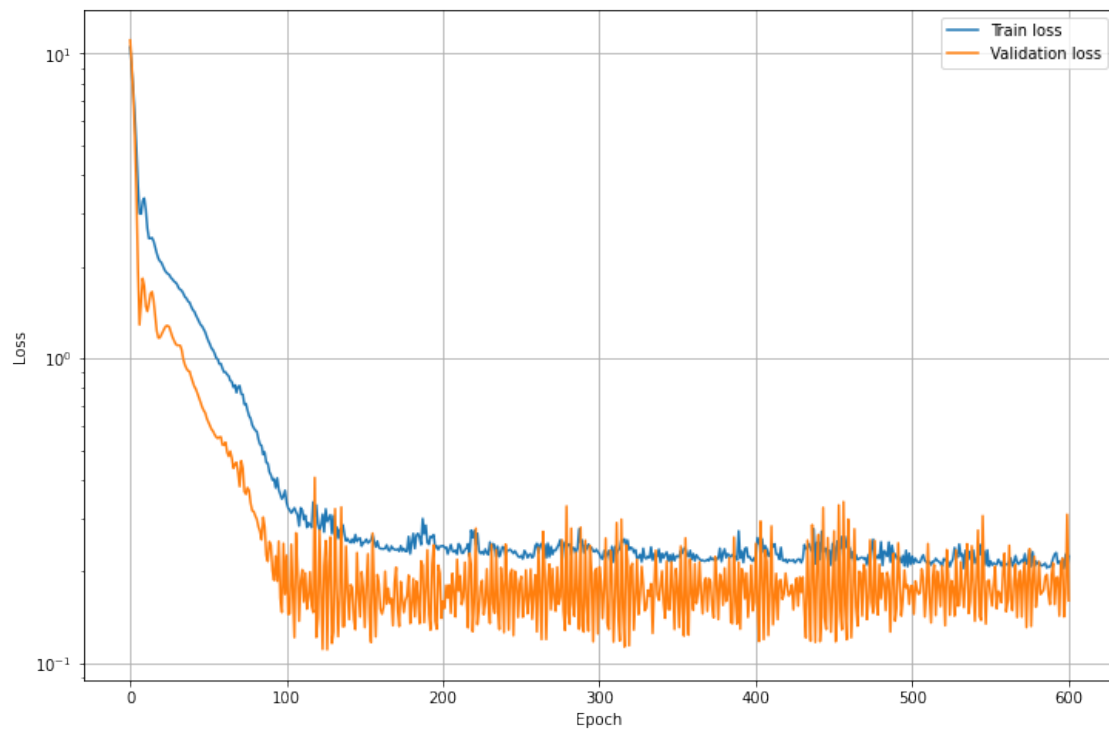
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Nh1                16
Nh2                32
Nh3               256
Nh4               256
activation_function ReLU()
lr                 0.001
weight_decay       0.001
train_batch_size   40
patience          200
avg_train_loss     0.175781
avg_val_loss       0.411058
Name: 32, dtype: object

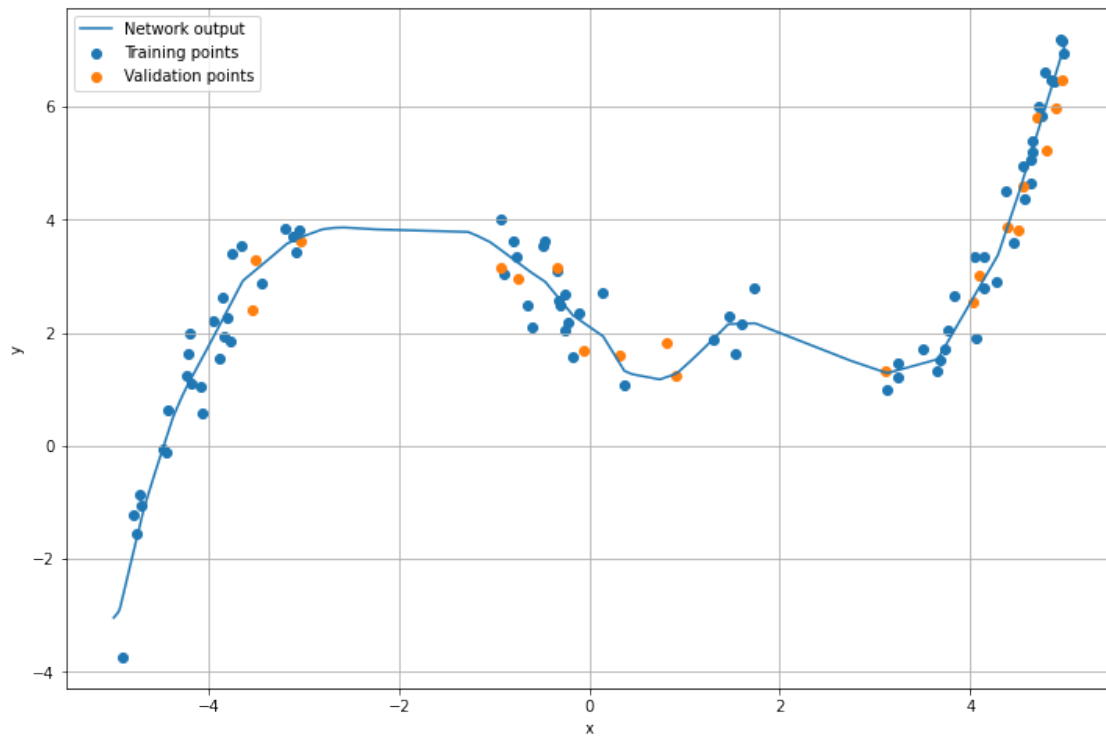
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Average train      loss in the last 10 epochs: 0.2180
Average validation loss in the last 10 epochs: 0.1897

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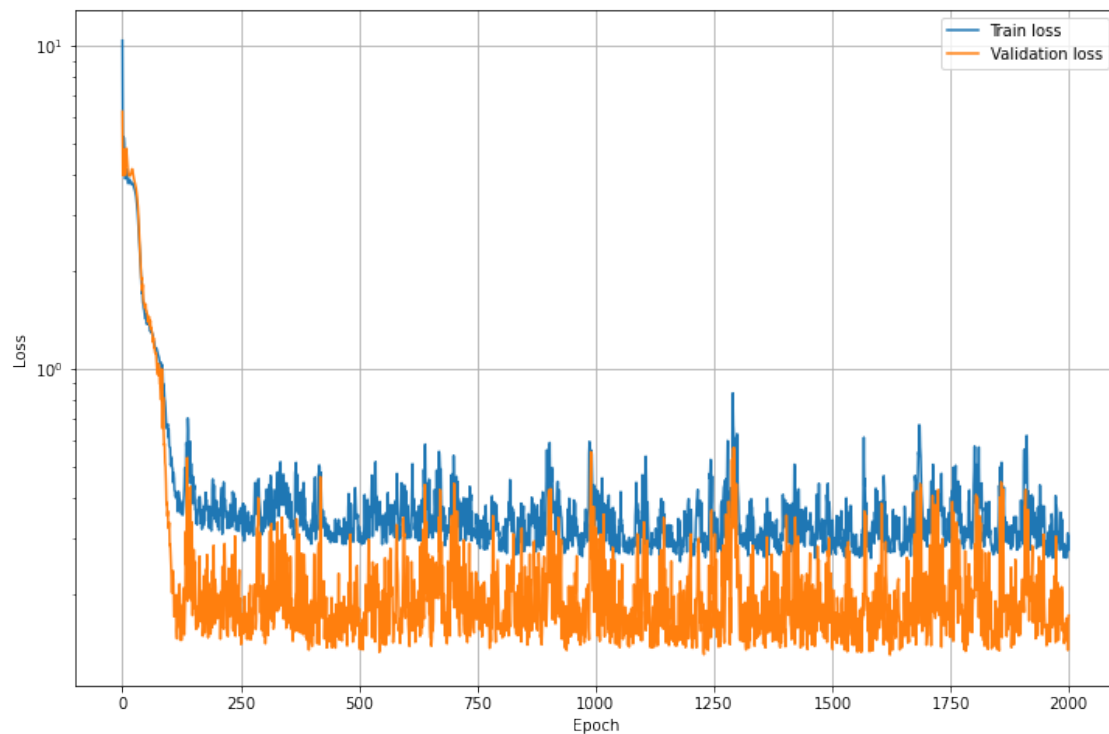
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Nh1 256  
Nh2 16  
Nh3 32  
Nh4 128  
activation\_function Sigmoid()  
lr 0.01  
weight\_decay 0.001  
train\_batch\_size 40  
patience 500  
avg\_train\_loss 0.277426  
avg\_val\_loss 0.375012  
Name: 33, dtype: object



Average train loss in the last 10 epochs: 0.2846  
Average validation loss in the last 10 epochs: 0.1564

