TripletAux

August 10, 2023

[1]:
```
"""Delete ths cell when done!"""
%load_ext autoreload
%autoreload complete
```

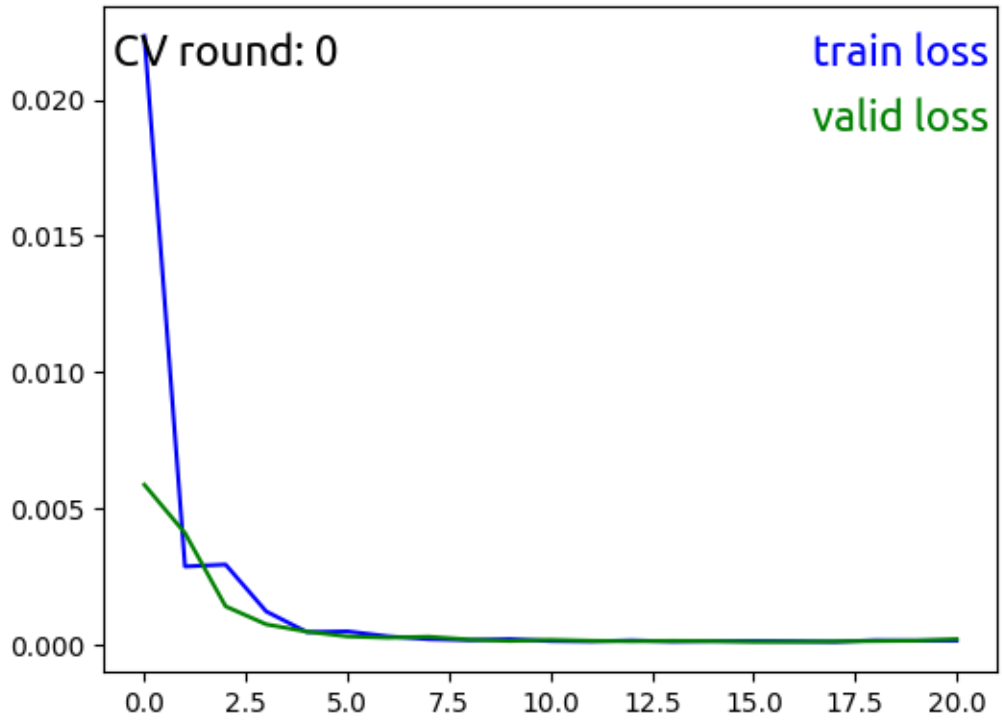
[2]:
```
import numpy as np
import torch
device = torch.device("cuda" if torch.cuda.is_available() else "cpu")
s = {
    'problem'           : "regression",
    'approach'          : "metric learning/non-parametric",
    'algorithm'         : "triplet network",
    'input'             : "samples from a distribution",
    'input type'        : "vectors",
    'input meaning'     : "spectrum",
    'output'            : "samples from a distribution",
    'output type'       : "one number",
    'output meaning'    : "temperature or pressure, depending on distribution",
    'learning rate'     : 1e-4,
    'input dimension'   : 10000,
    'output dimension'  : 1,
    'feature dimension' : 300,
    'epoch'             : 1000,
    'epoch-development' : 1,
    'cross validation round': 16,
    'cross validation round-development' : 1,
    'batch size'        : 64,
    'best model folder' : 'triplet_best_model/'
}
# https://arxiv.org/pdf/1412.6622.pdf
import data_accessor as acc
datas = [
    'temperature_230509_discrete',
    'pressure_230516_discrete'
    ]
data_dictionary = acc.setup(datas)
```

```
loading temperature_230509_discrete____________________________
        input shape (number, dimension): (6000, 10000)
```

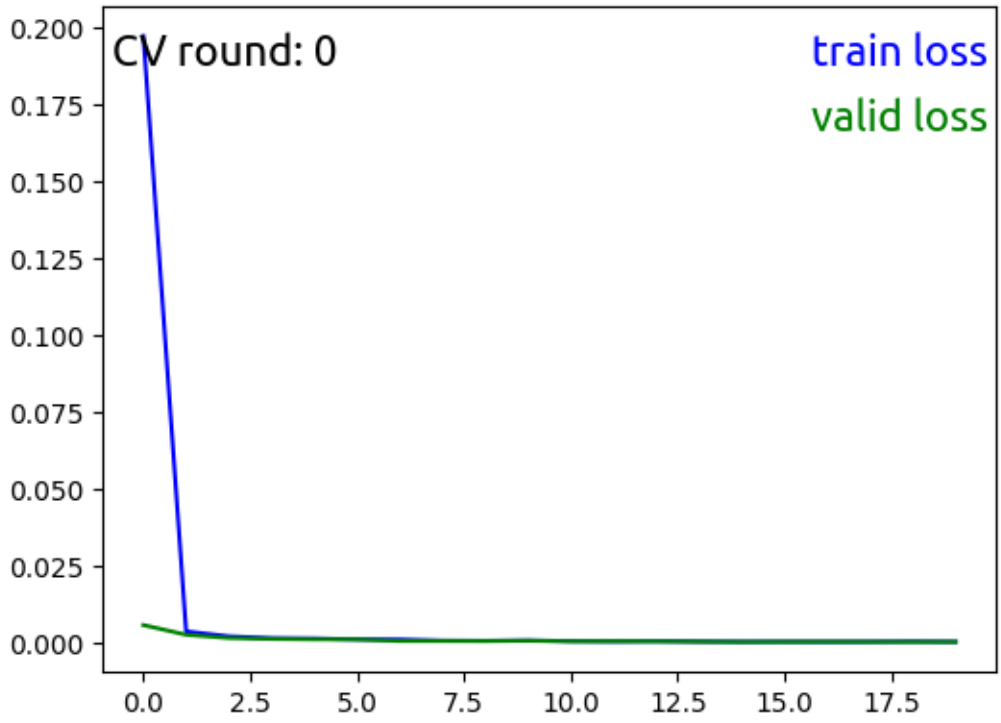
```
        label shape (number, dimension): (6000, 1)
        there are 16 folds
        4200 for training, 600 for validating, 1200 for testing
loading pressure_230516_discrete__________________________
        input shape (number, dimension): (5000, 10000)
        label shape (number, dimension): (5000, 1)
        there are 16 folds
        3500 for training, 500 for validating, 1000 for testing
```

[5]:
```
from CrossValidation import CrossValidator
from tools import SaveBestCrossValidationModel
from Triplet import TripletDataset, TripletAuxManager
from data import alternate_rows_itertools
# datas.reverse()
CVtor = CrossValidator(s['cross validation round'],
                       s['epoch'],
                       SaveBestCrossValidationModel(s['best model folder']),
                       TripletDataset,
                       datas,
                       data_dictionary,
                       TripletAuxManager,
                       s,
                       device)
# CVtor.single_task_train(0)
CVtor.multi_task_train_sequential()
# CVtor.multi_task_train_weave(alternate_rows_itertools)
CVtor.complete_notify()
CVtor.test_all()
```

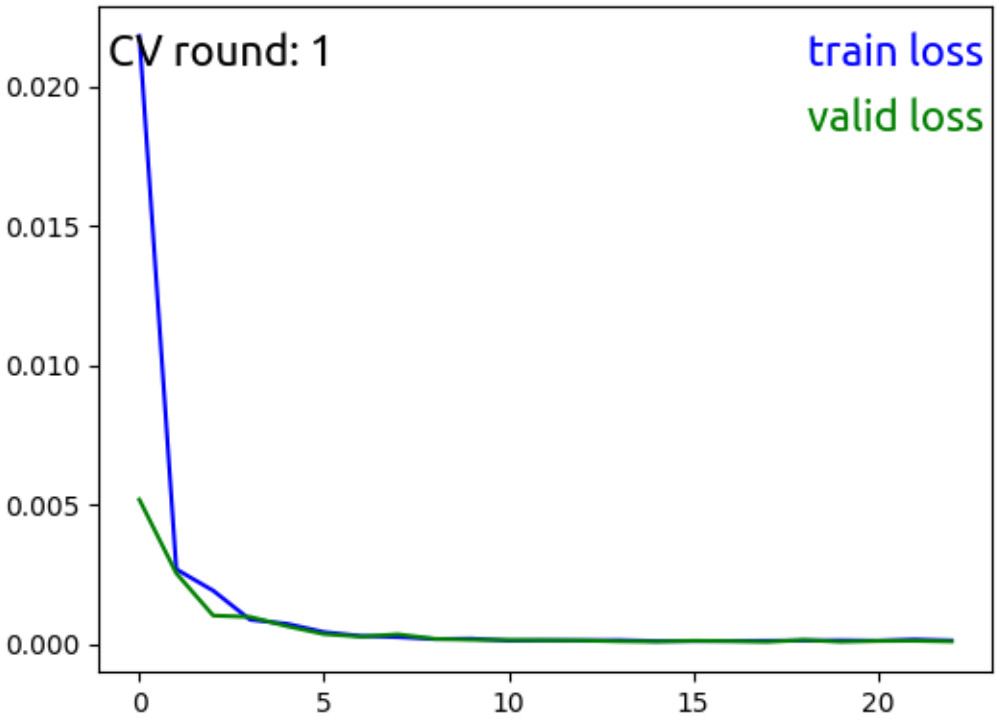
```
__________CROSS VALIDATION__________
Cross-validation rounds: 16
Epochs: 1000
Datas to learn:
        0: temperature_230509_discrete
        1: pressure_230516_discrete
MULTI TASK, Sequential_____________________________
we're learning: multiple tasks
given [1, 2, 3], [a, b, c]: learn [1, 2, 3], reset model, learn [a, b, c]
CV round 0_________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 20
min train loss: 0.0001097764015867142
min valid loss: 0.0001088430180971045
```



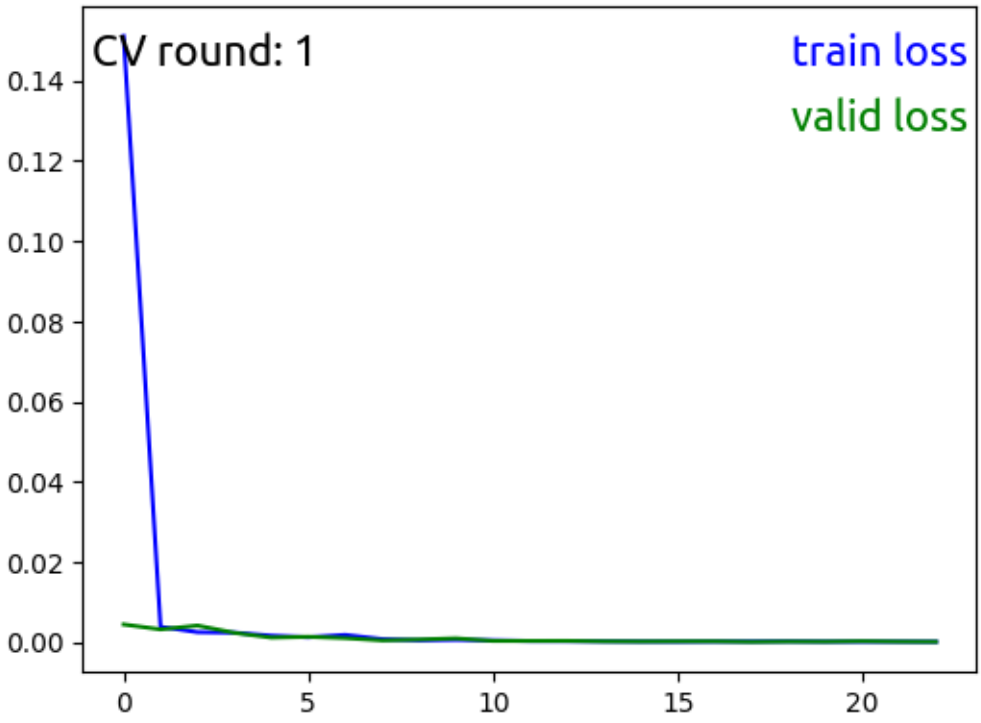

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 19
min train loss: 0.000217415198196911
min valid loss: 0.00021218211986706592
```



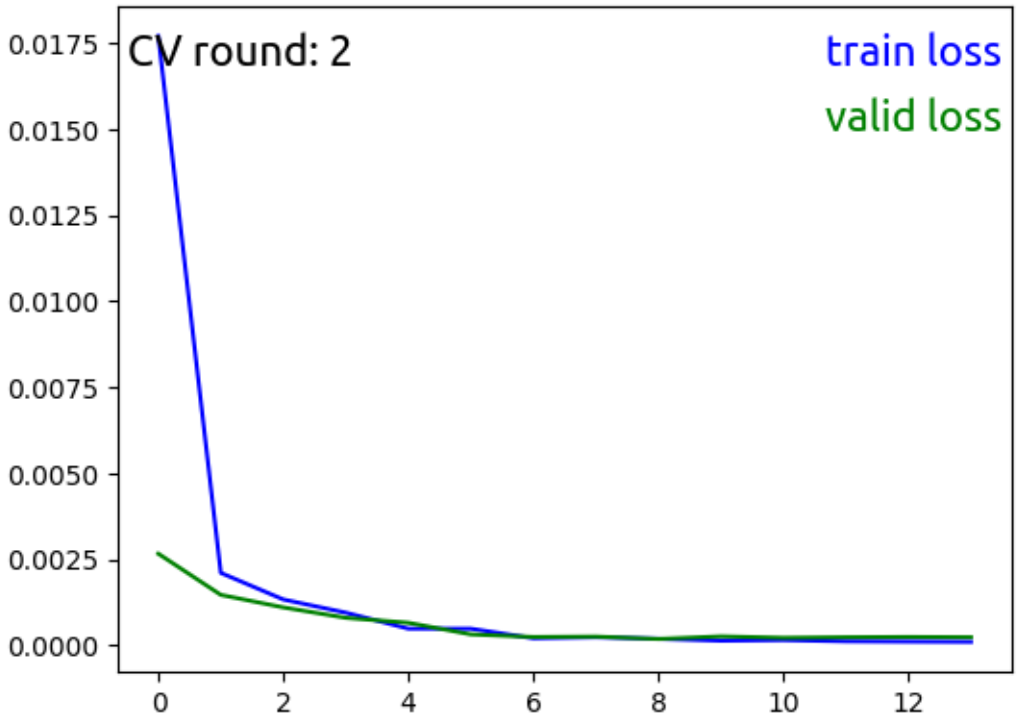

```
CV round 1__________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 22
min train loss: 0.00010013557606946438
min valid loss: 7.249725676956586e-05
```



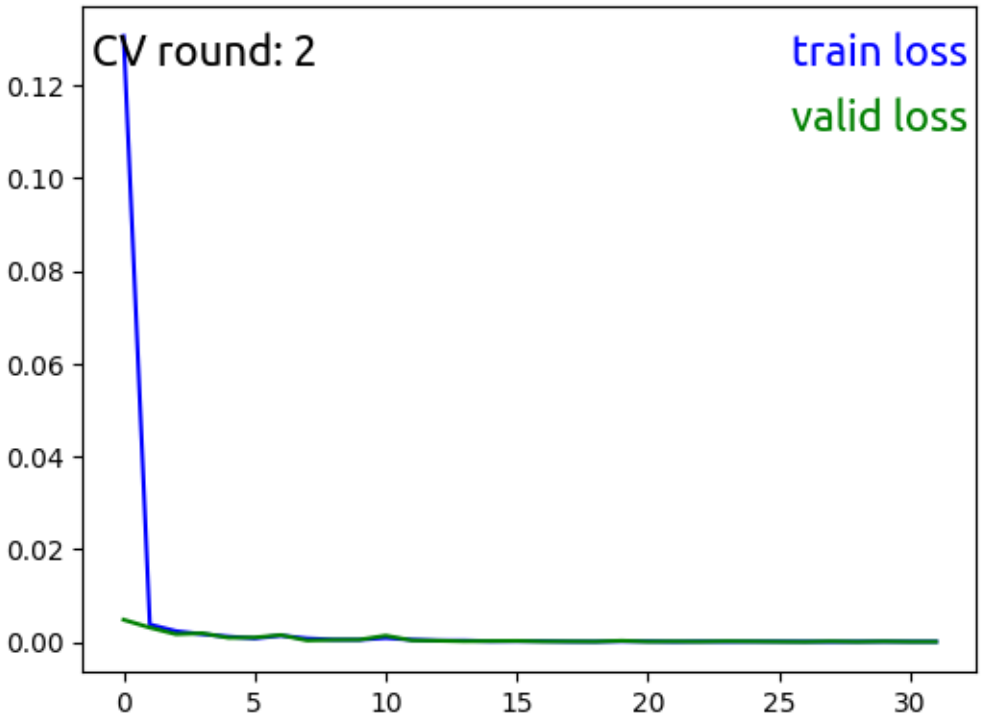

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 22
min train loss: 0.00014240326867862182
min valid loss: 0.00011948184692300856
```



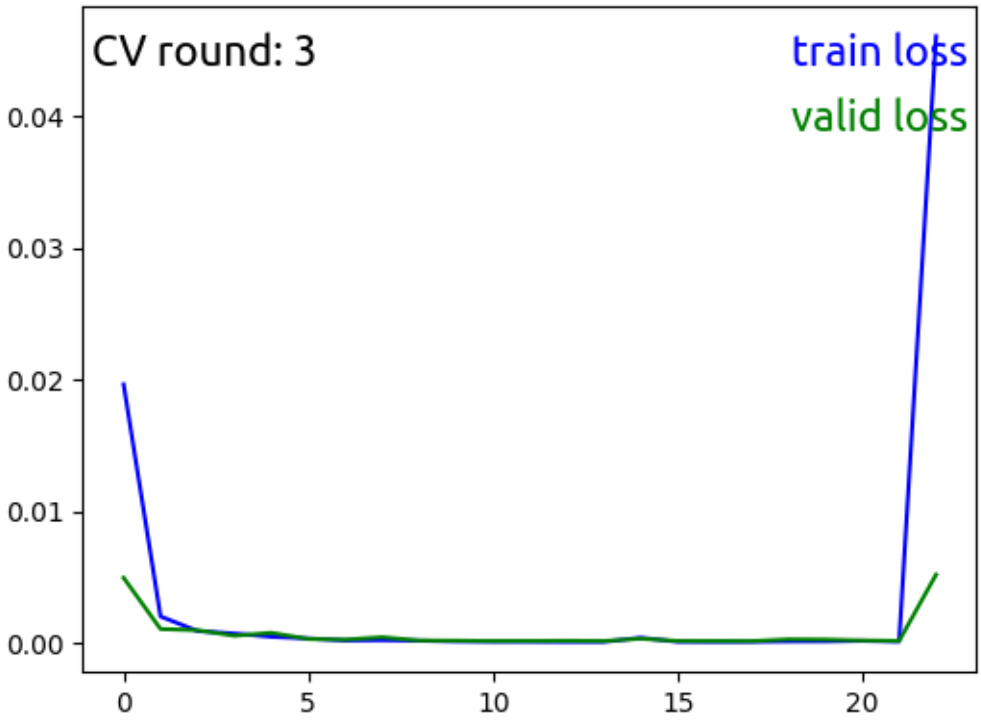

```
CV round 2_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 13
min train loss: 0.00010229873287519722
min valid loss: 0.000185910416621482
```



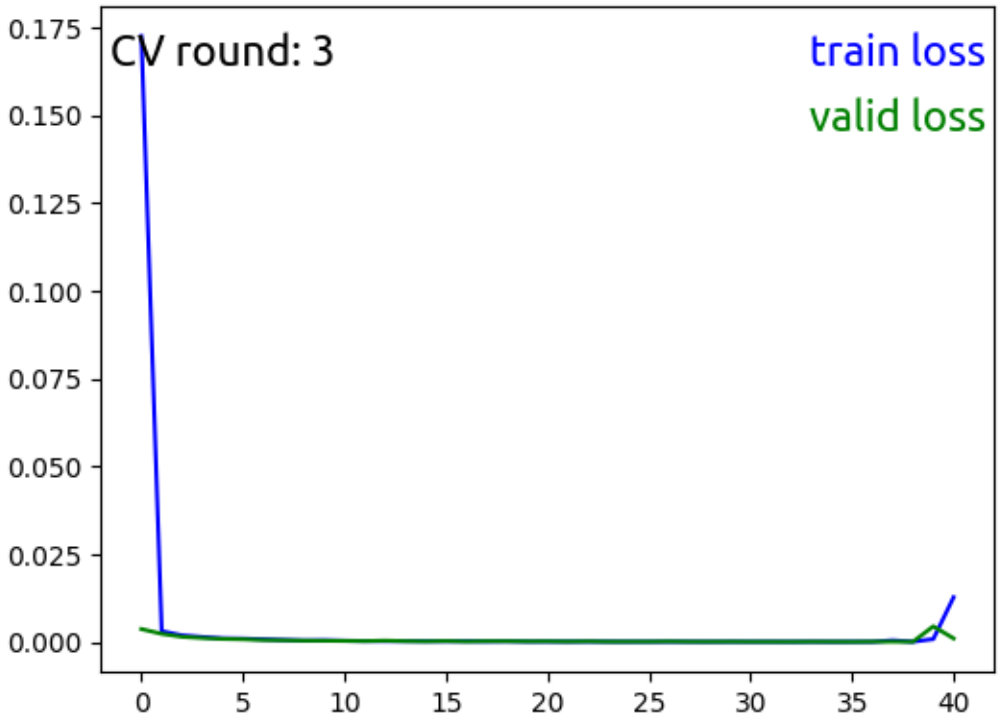

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 31
min train loss: 0.00012546595720447262
min valid loss: 0.00010187448151555145
```



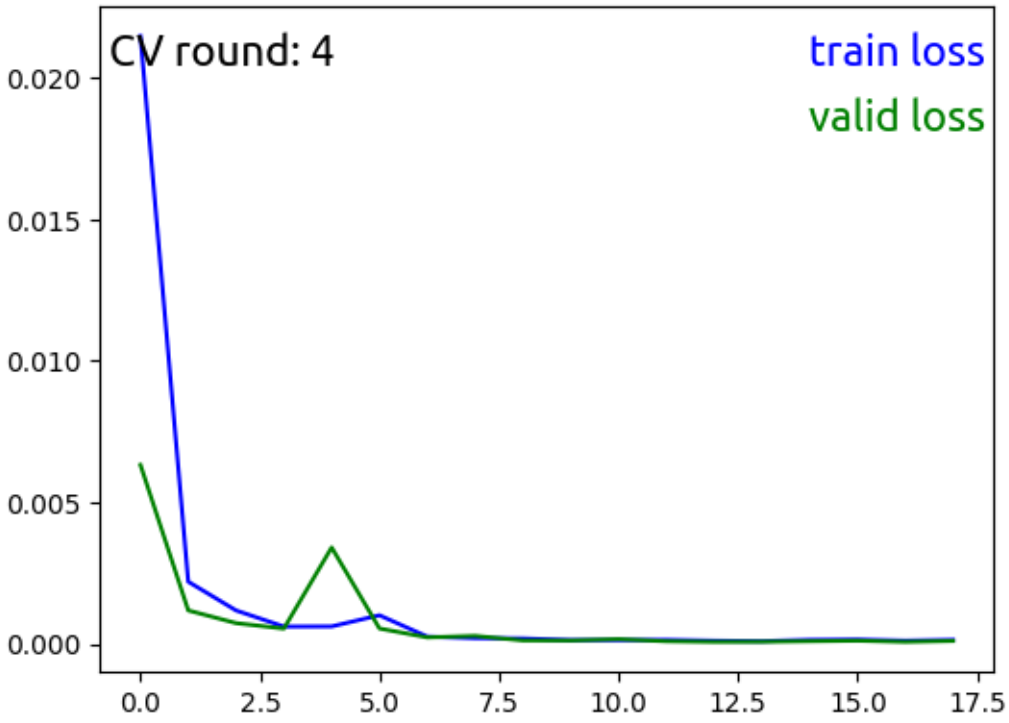

```
CV round 3_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 22
min train loss: 0.00010929378384554928
min valid loss: 0.00016152025200426577
```



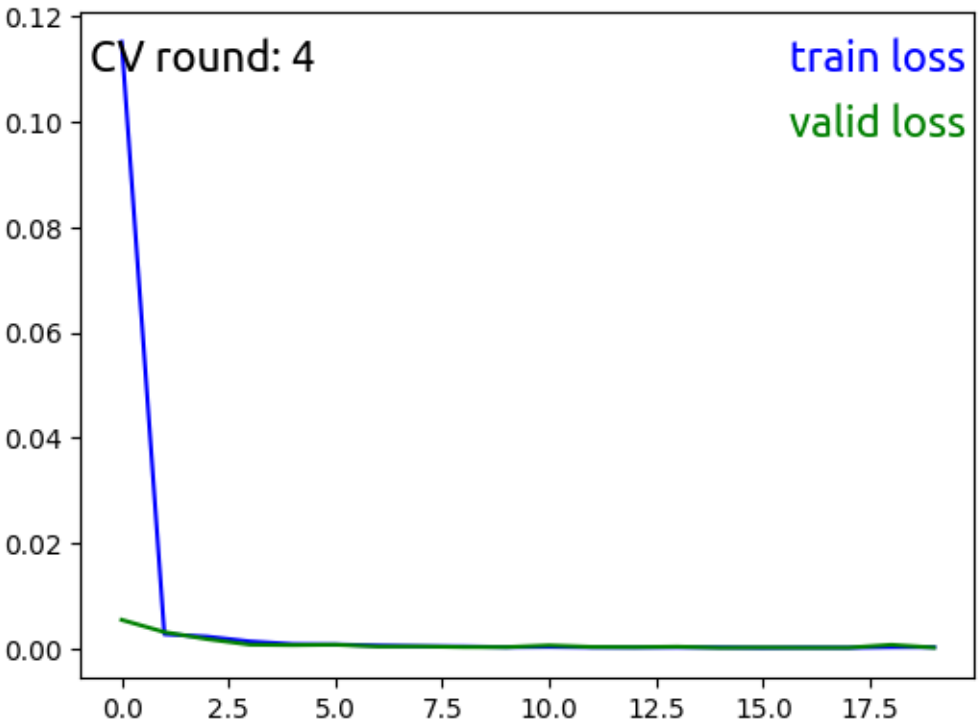

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 40
min train loss: 7.508414061951705e-05
min valid loss: 6.211524259924772e-05
```



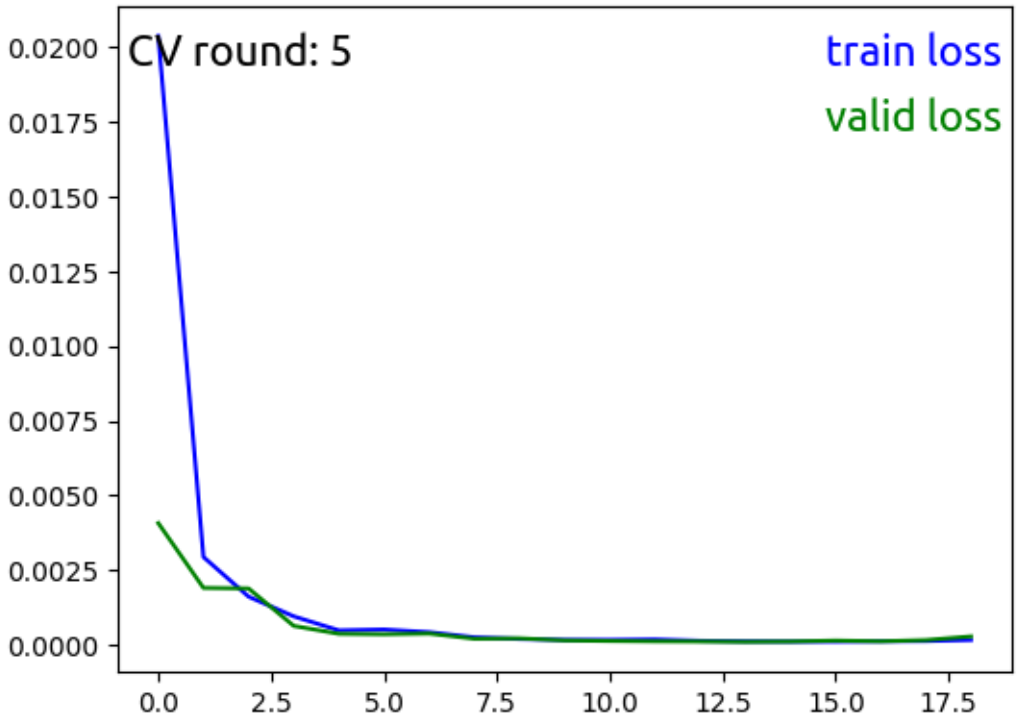

```
CV round 4_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 17
min train loss: 0.00010510486969327427
min valid loss: 8.125972053676377e-05
```



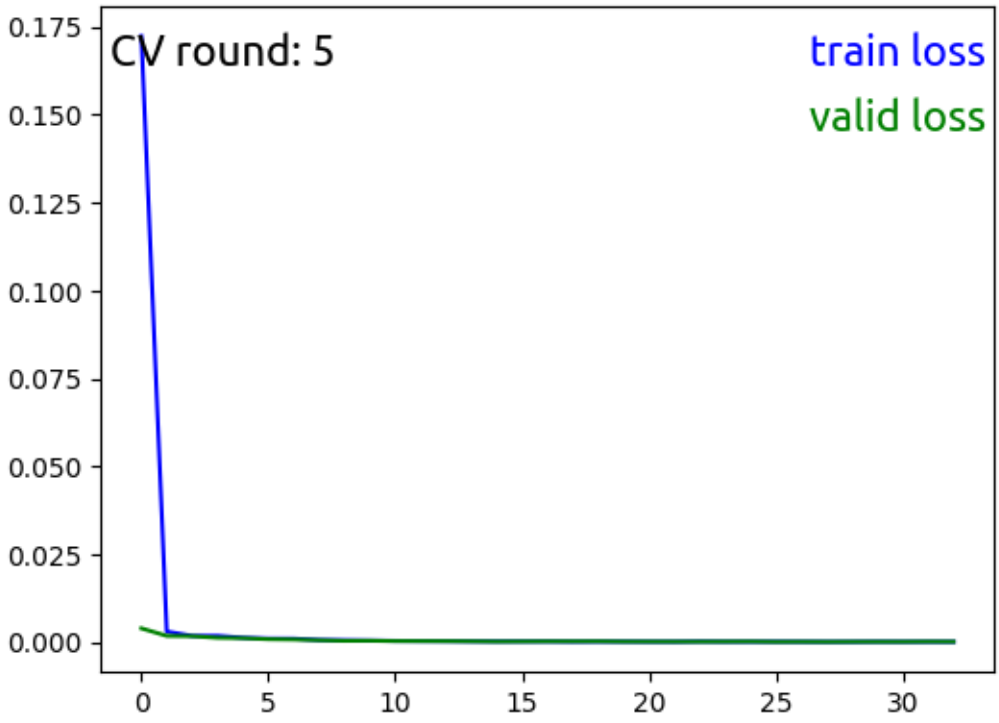

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 19
min train loss: 0.00016169359349243513
min valid loss: 0.0001759569959176588
```



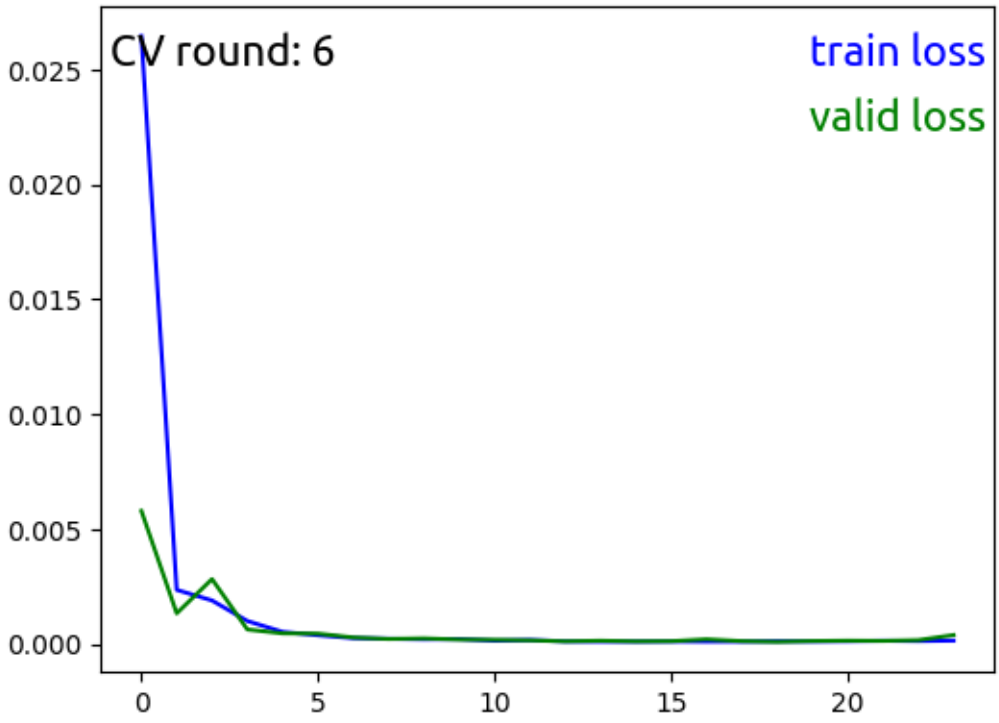

```
CV round 5_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 18
min train loss: 0.00010521164845020834
min valid loss: 9.59841963776853e-05
```



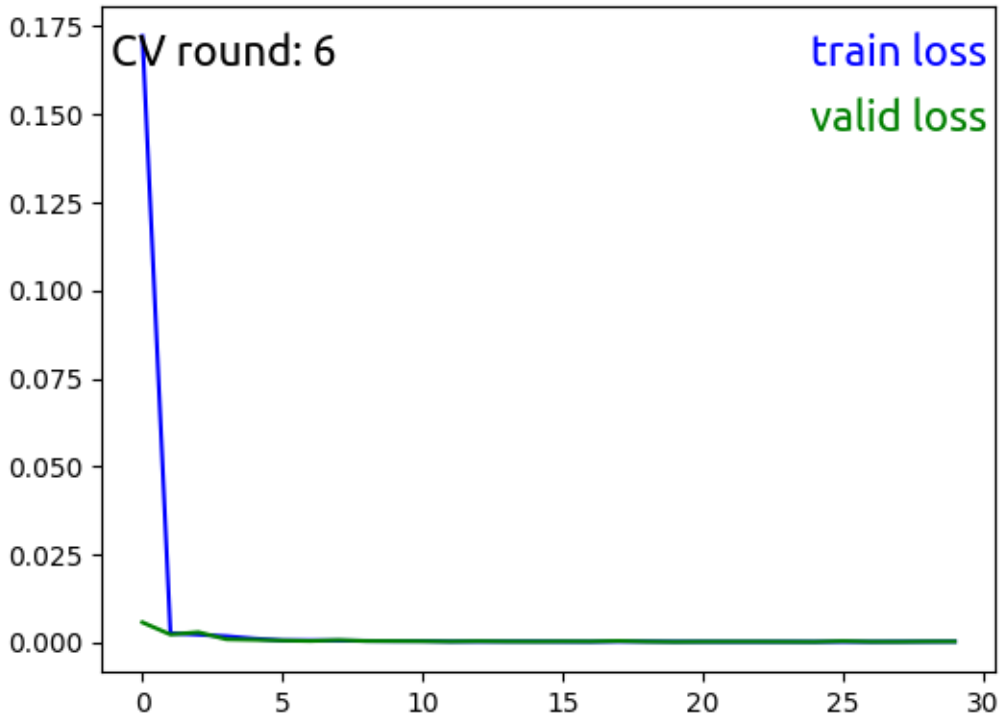

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 32
min train loss: 6.778277939619412e-05
min valid loss: 6.235374303287244e-05
```



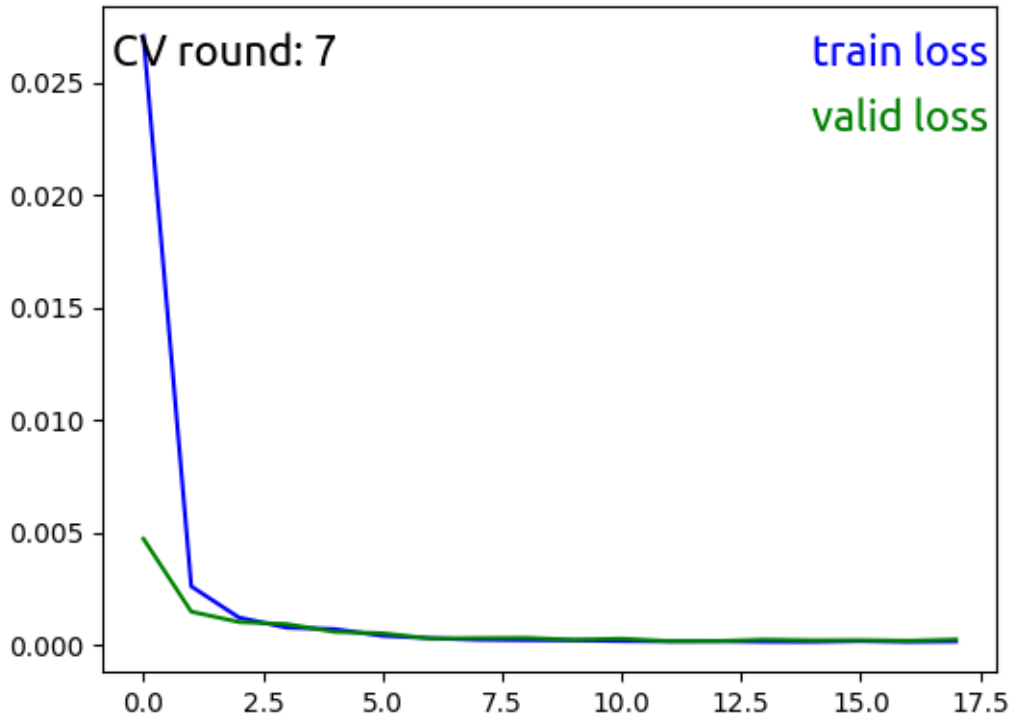

```
CV round 6_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 23
min train loss: 0.00010251243728623993
min valid loss: 8.999681522254832e-05
```



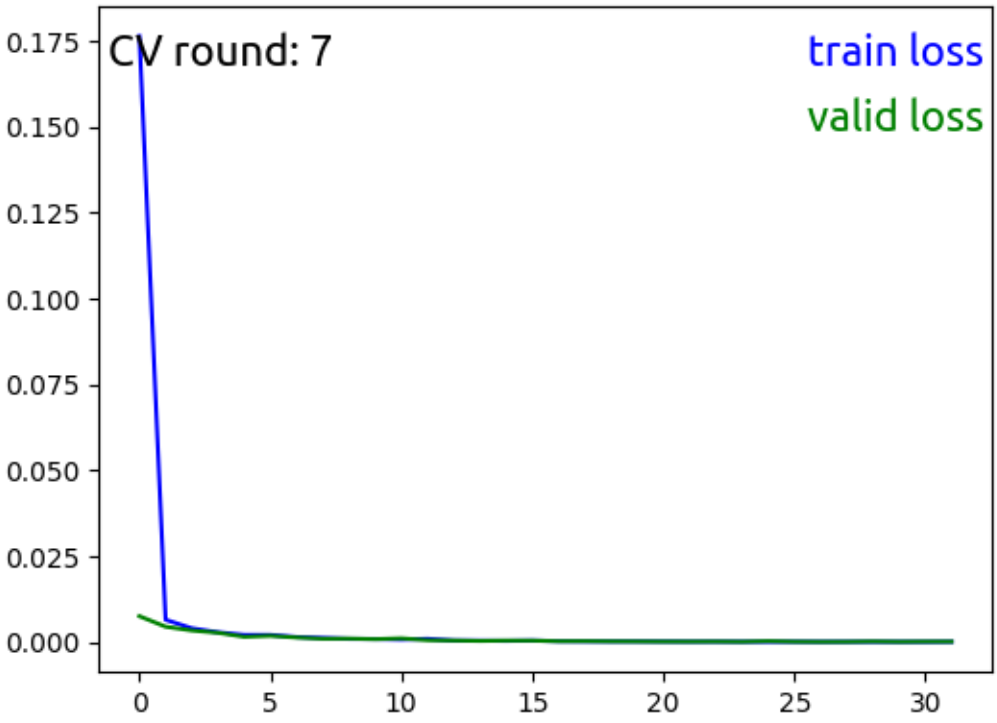

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 29
min train loss: 0.00014416341013698416
min valid loss: 0.0001342346913588699
```



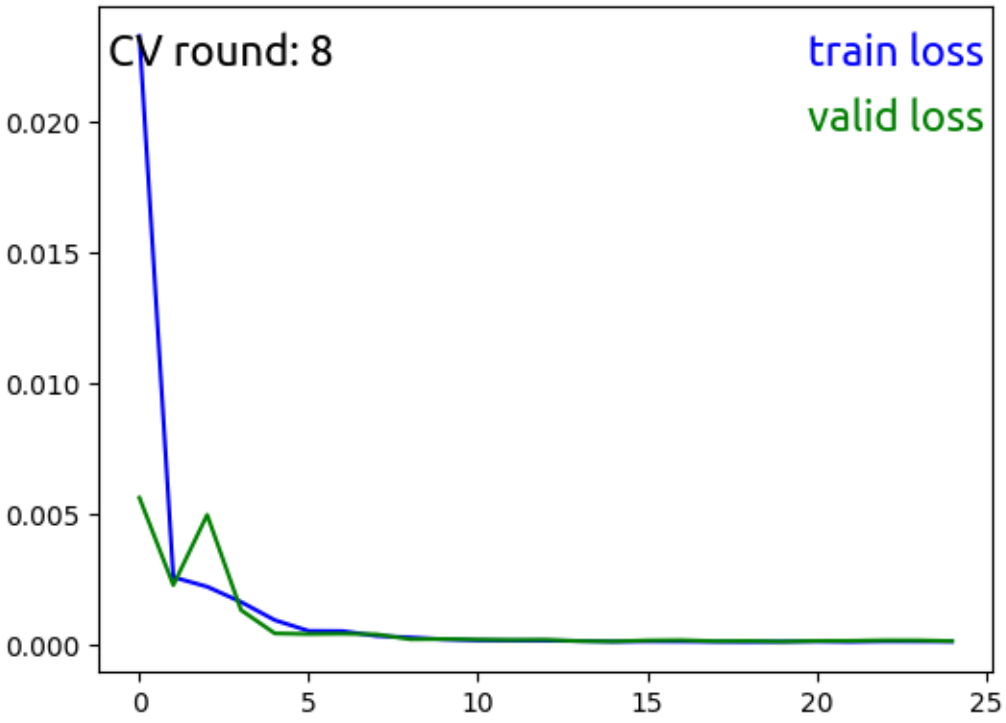

```
CV round 7_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 17
min train loss: 0.00013893253708374687
min valid loss: 0.00017246105562662706
```



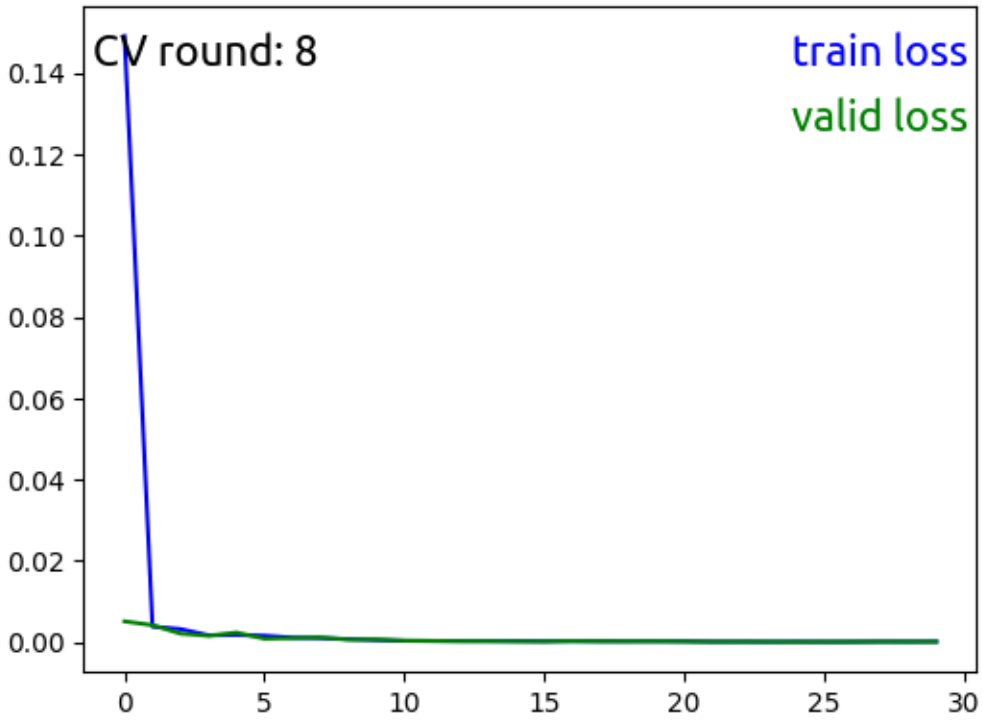

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 31
min train loss: 0.00010627794095357372
min valid loss: 0.00010137202116311528
```



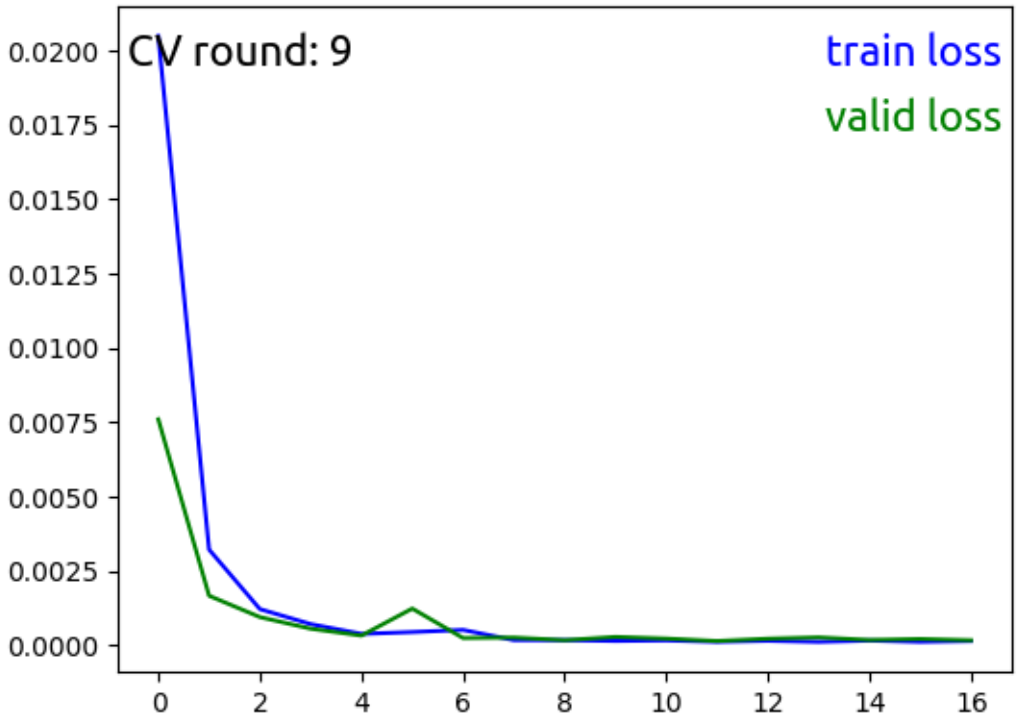

```
CV round 8_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 24
min train loss: 9.212503501850844e-05
min valid loss: 0.00010226909071207047
```



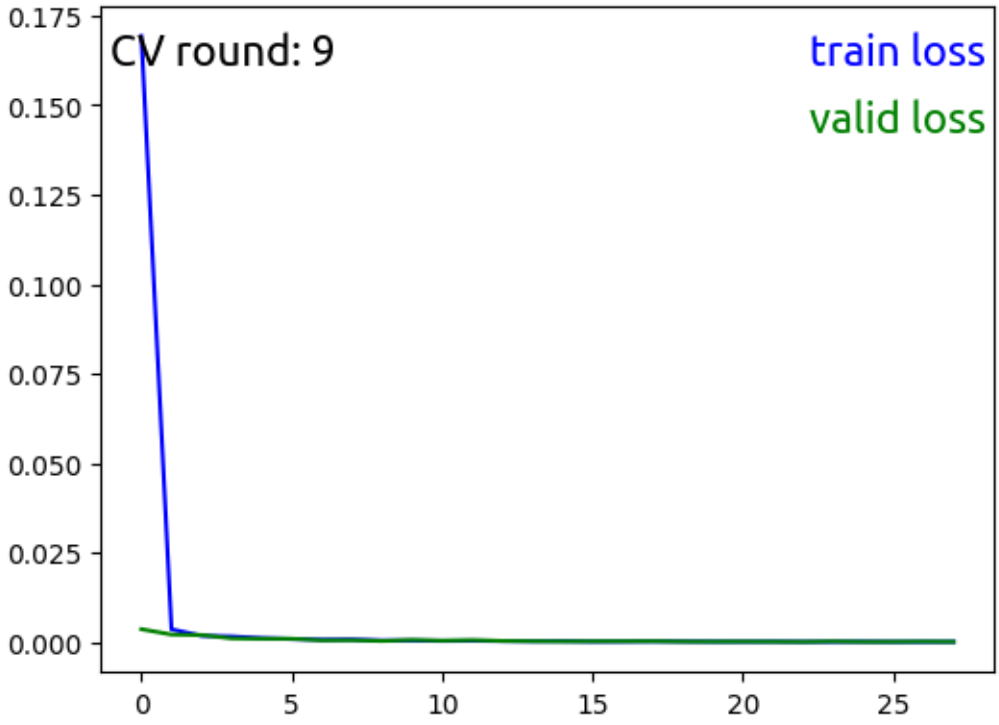

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 29
min train loss: 0.00011272502332841131
min valid loss: 0.00010023564846051158
```



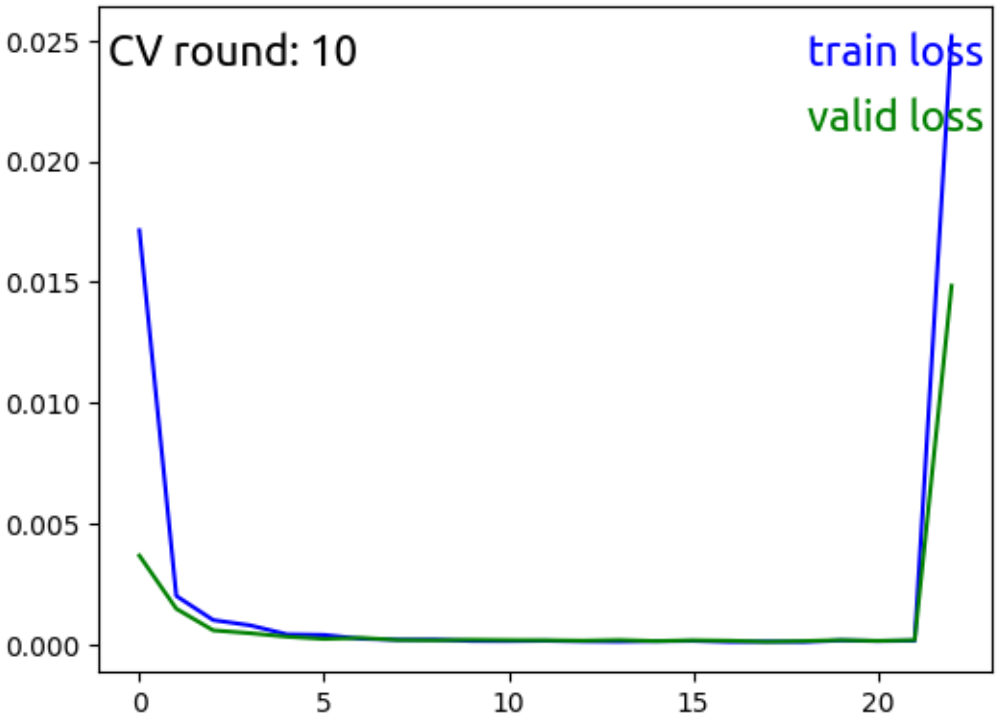

```
CV round 9_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 16
min train loss: 0.00011795021159879539
min valid loss: 0.00014596442633774132
```



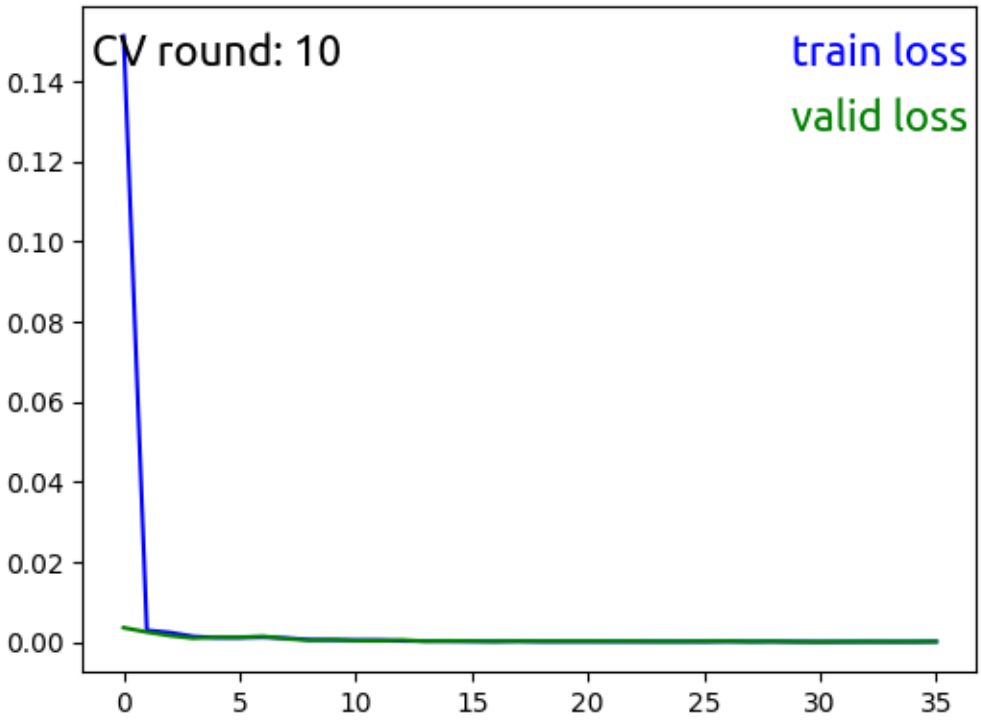

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 27
min train loss: 9.639663621783257e-05
min valid loss: 9.434680487174774e-05
```



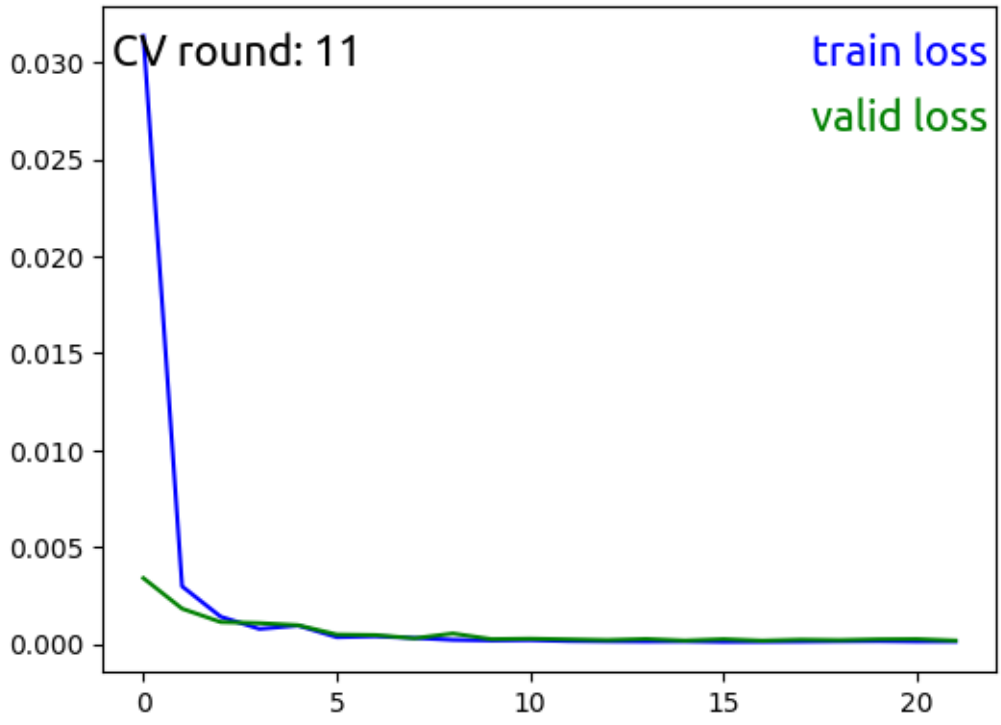

```
CV round 10_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 22
min train loss: 0.00010139124567627512
min valid loss: 0.00010556333436397835
```



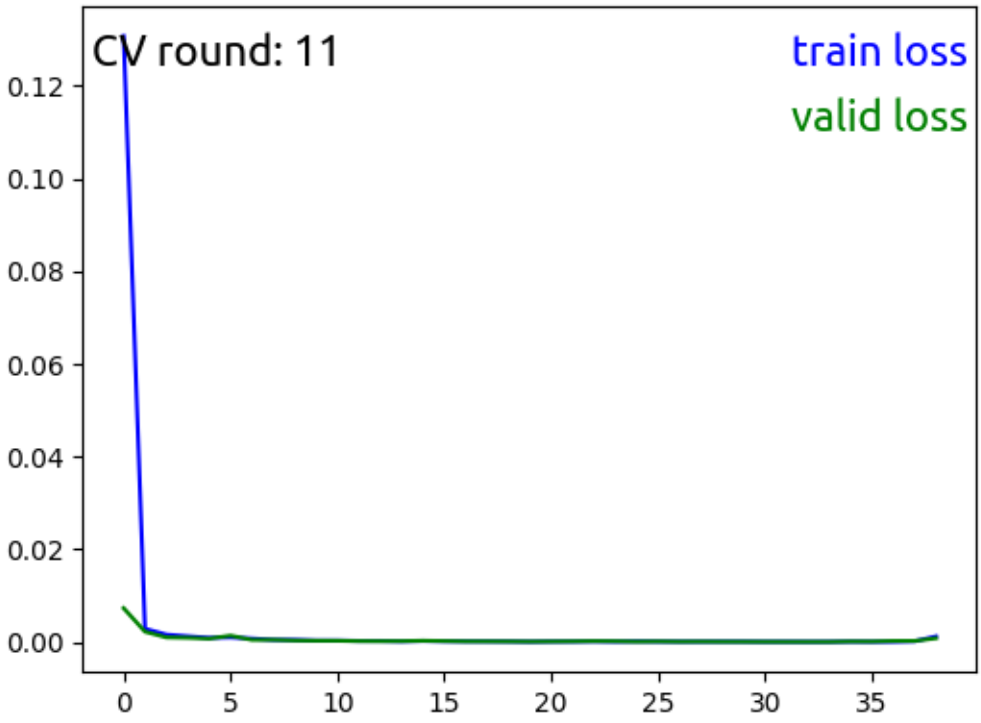

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 35
min train loss: 7.974508255508475e-05
min valid loss: 7.50301969674183e-05
```



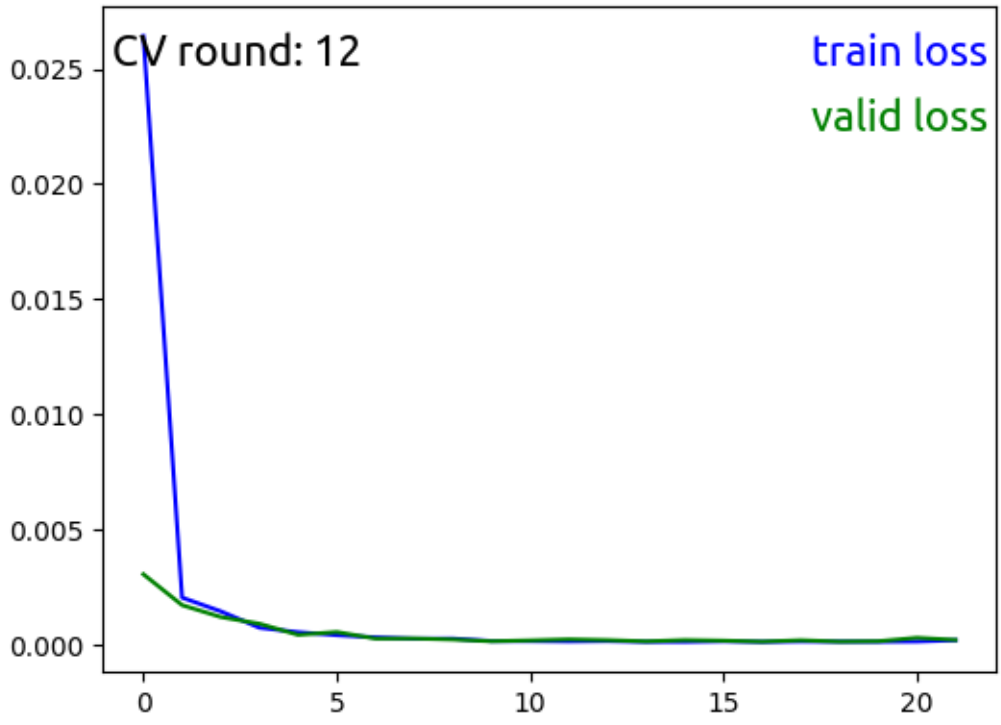

```
CV round 11_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 21
min train loss: 0.00011914196197308642
min valid loss: 0.00018230926943942904
```



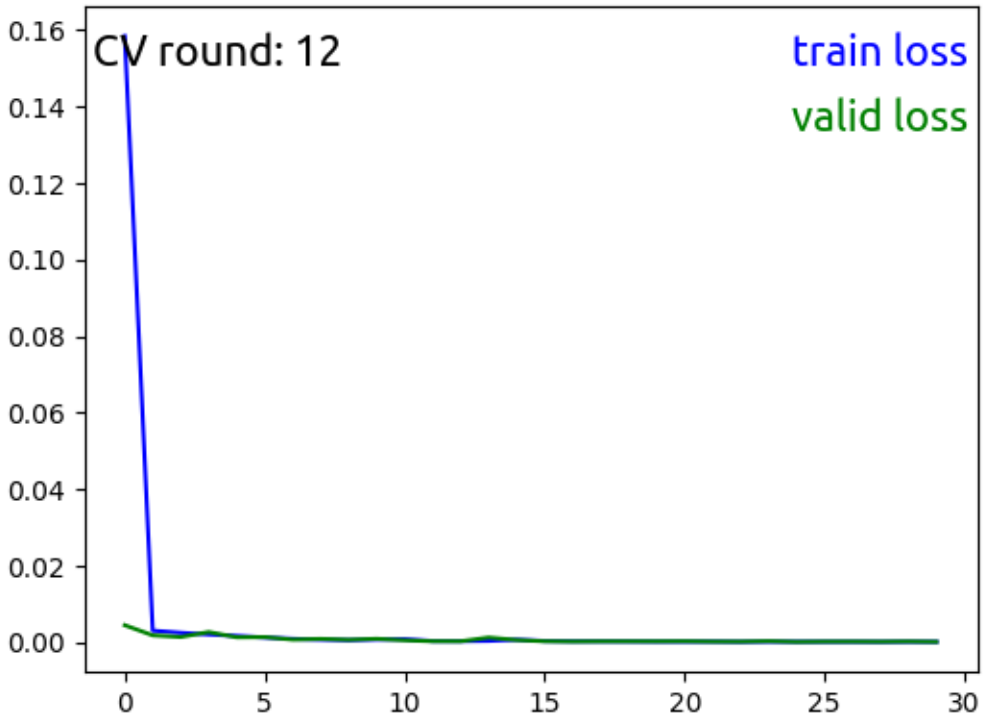

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 38
min train loss: 8.545275241803293e-05
min valid loss: 8.064667872531572e-05
```



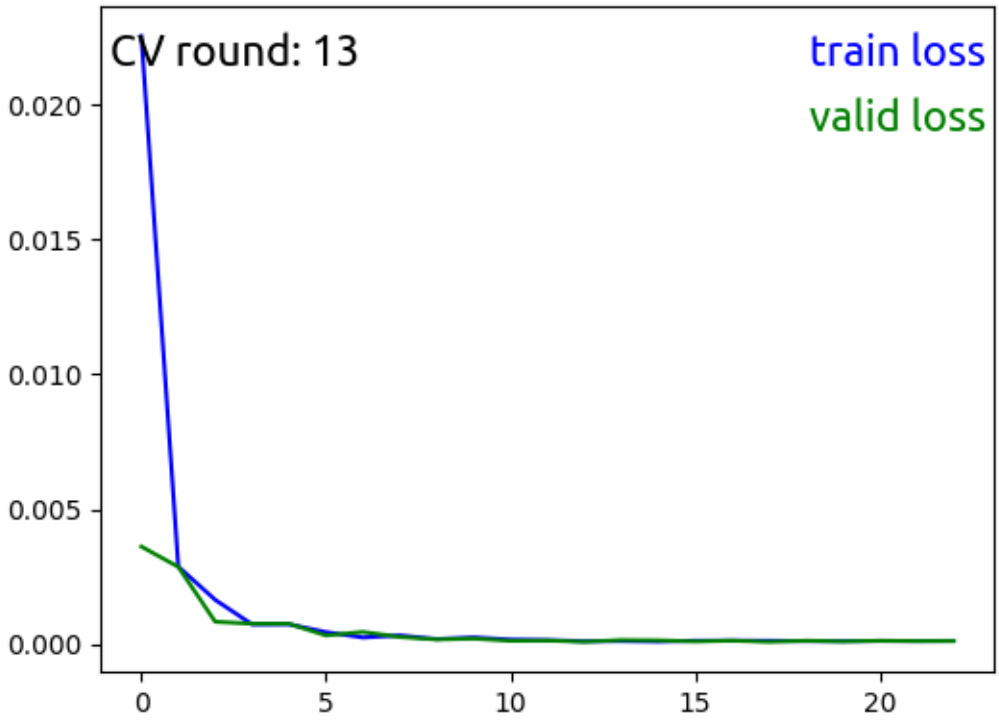

```
CV round 12_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 21
min train loss: 0.00011064159491180555
min valid loss: 0.00011854924305225723
```



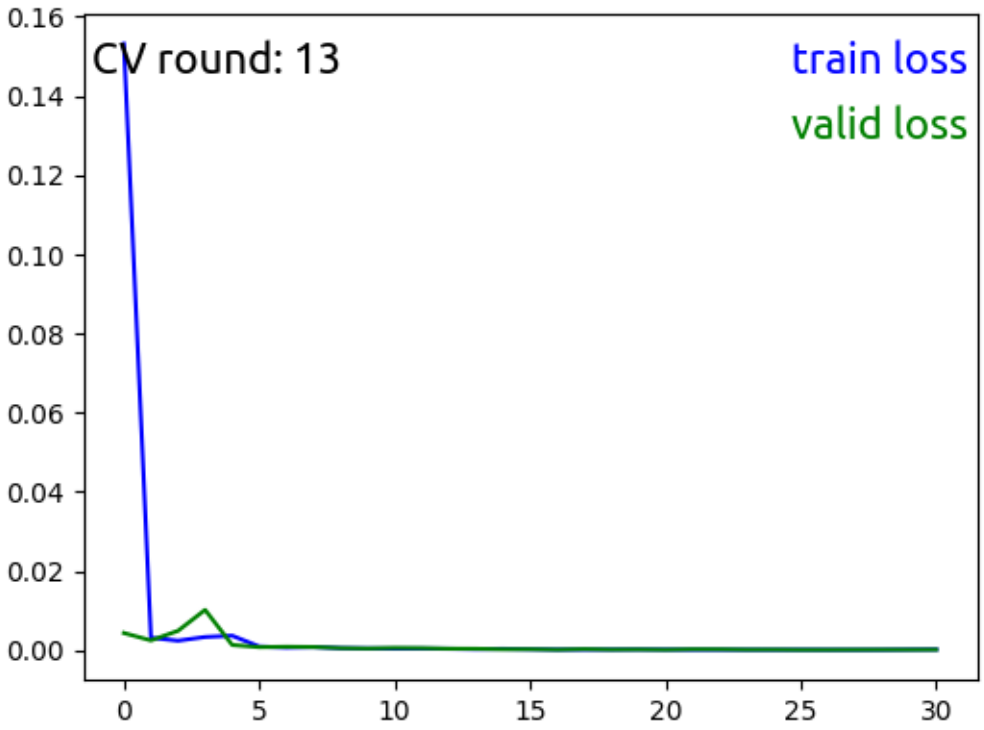

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 29
min train loss: 0.0001174763837215406
min valid loss: 0.00011350649492669618
```



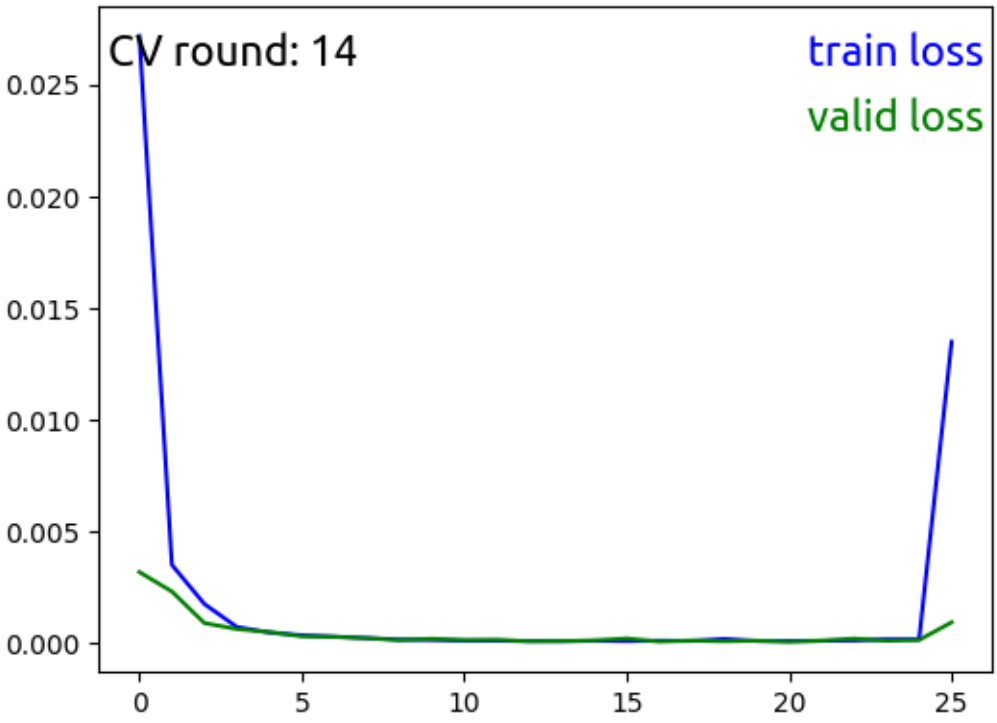

```
CV round 13_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 22
min train loss: 9.876165941849732e-05
min valid loss: 8.640668238513172e-05
```



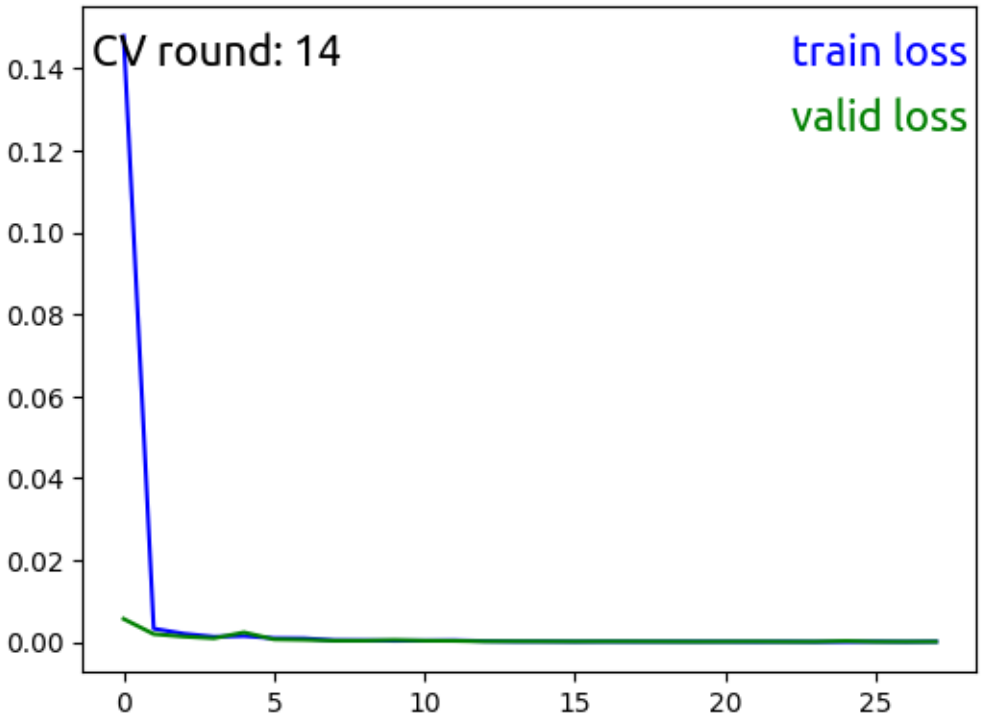

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 30
min train loss: 0.00011515191608023914
min valid loss: 0.00011452639773779083
```



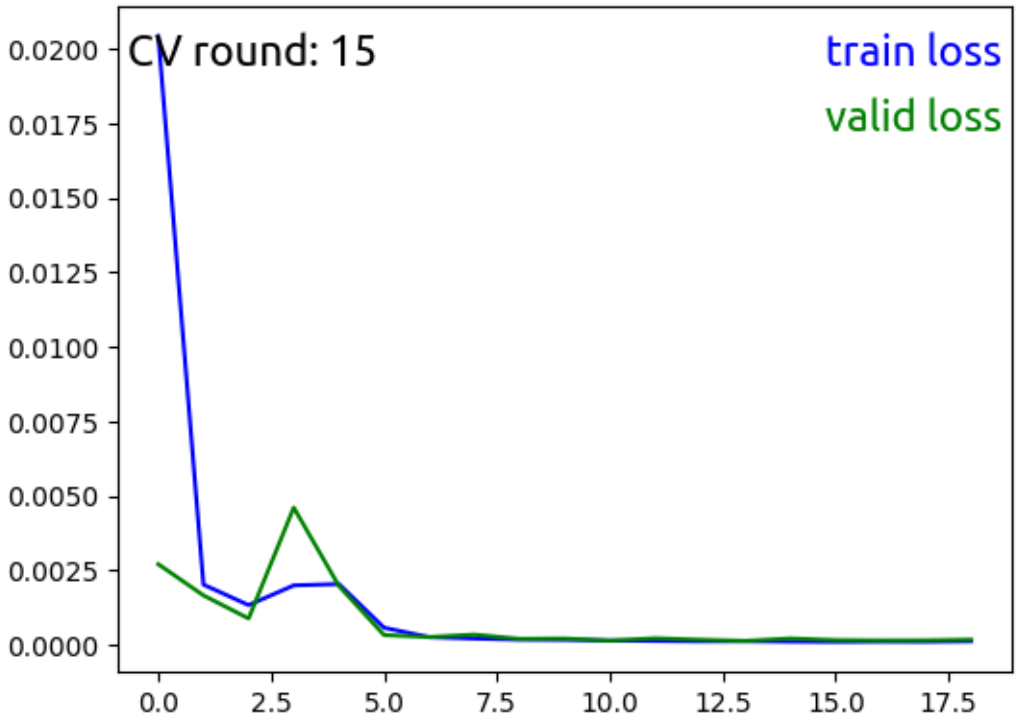

```
CV round 14_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 25
min train loss: 0.00011372791011650186
min valid loss: 7.974519648996647e-05
```



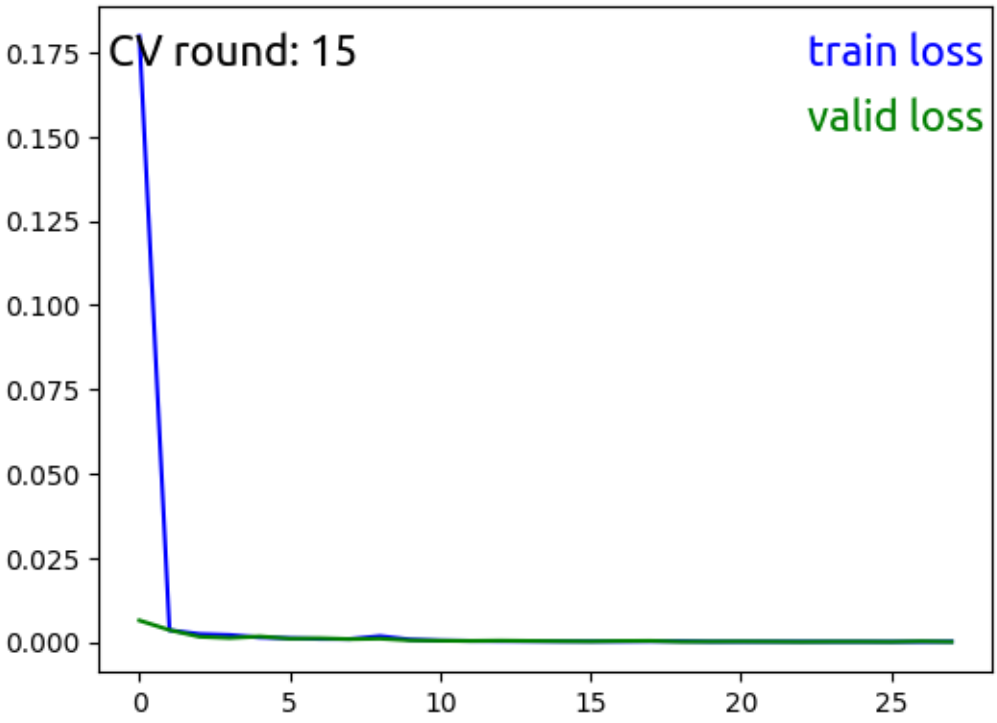

```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 27
min train loss: 9.797500421303663e-05
min valid loss: 0.00012526642603916116
```




```
CV round 15_____________________________________
using: 0 temperature_230509_discrete
EARLY STOPPING @ epoch 18
min train loss: 9.805075867255006e-05
min valid loss: 0.00013027928362134843
```




```
using: 1 pressure_230516_discrete
EARLY STOPPING @ epoch 27
min train loss: 0.00011925194862256334
min valid loss: 9.167439566226676e-05
```




```
BEST model: CV=3.pth with 6.211524259924772e-05
trained datas sequentially
Aggregate performance: yo
temperature_230509_discrete: Valid loss mean 0.00011997245360362285, std
3.7177900112748354e-05
pressure_230516_discrete: Valid loss mean 0.00011030026161051865, std
3.807674894435908e-05
  TRAINing COMPLETE_____________________________
TEST_____________________________
Testing temperature_230509_discrete, loss:  0.4063507898857719
Testing pressure_230516_discrete, loss:  0.0010482210309419315
```