TripletAux

August 10, 2023

[2]:
```
"""Delete ths cell when done!"""
%load_ext autoreload
%autoreload complete
```

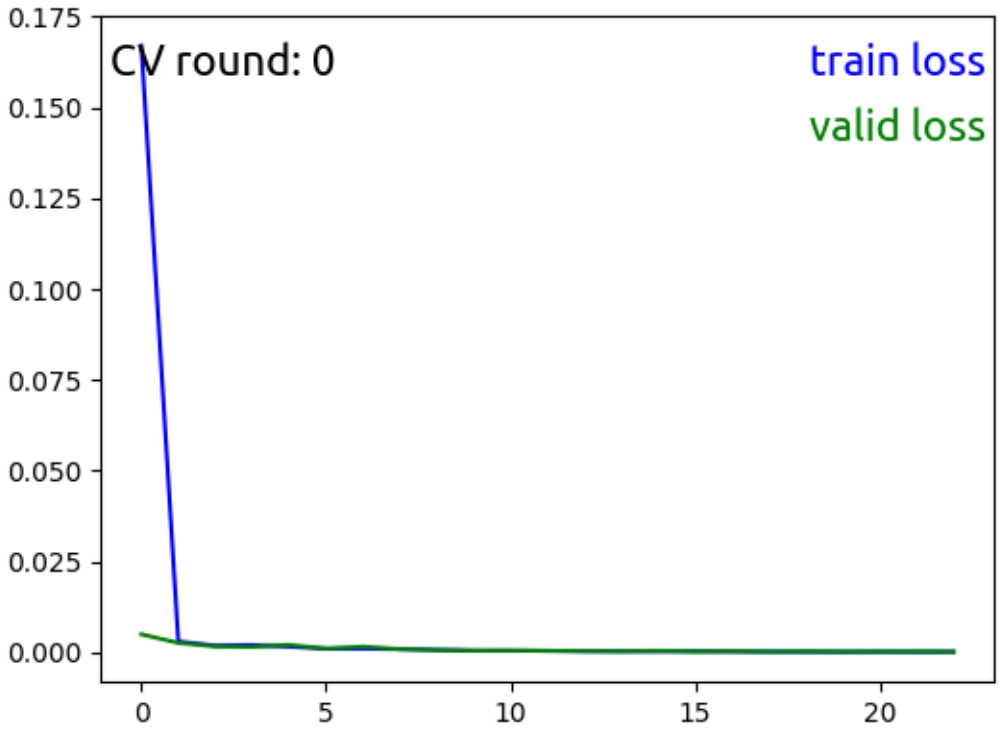
[3]:
```
import numpy as np
import torch
device = torch.device("cuda" if torch.cuda.is_available() else "cpu")
s = {
    'problem'           : "regression",
    'approach'          : "metric learning/non-parametric",
    'algorithm'         : "triplet network",
    'input'             : "samples from 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)
```

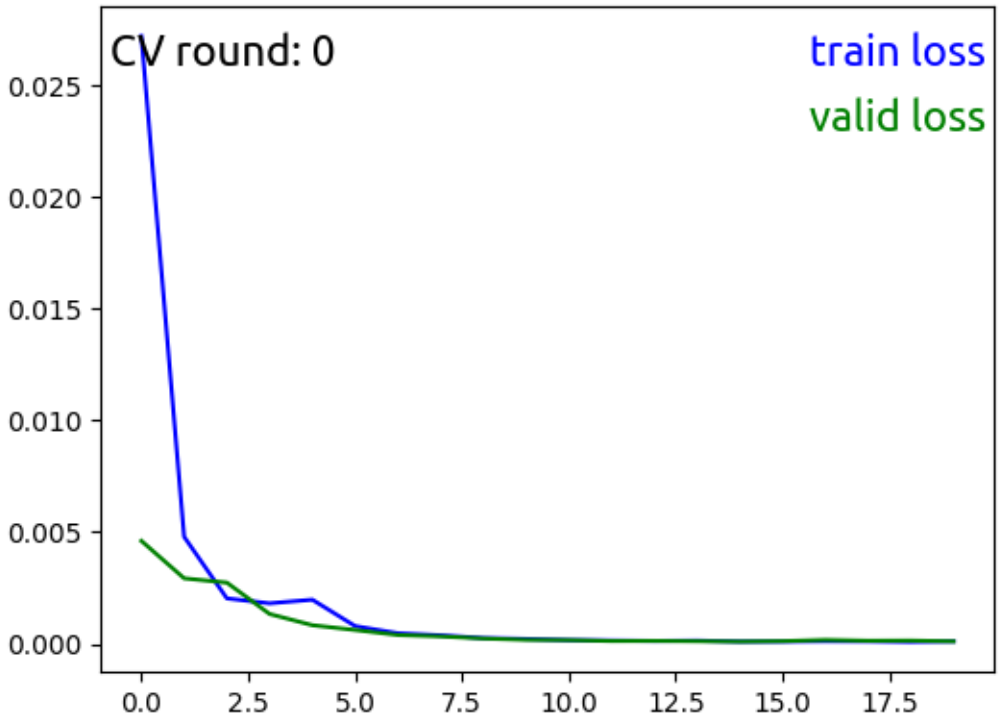
```
        label shape (number, dimension): (6000, 1)
        there are 16 folds
        4200 for training, 600 for validating, 1200 for testing
loading pressure_230516_discrete___________________________
        input shape (number, dimension): (5000, 10000)
        label shape (number, dimension): (5000, 1)
        there are 16 folds
        3500 for training, 500 for validating, 1000 for testing
```

[4]:
```
from CrossValidation import CrossValidator
from tools import SaveBestCrossValidationModel
from Triplet import TripletDataset, TripletAuxManager
from data import alternate_rows_itertools
# datas.reverse()
datas = [
    'pressure_230516_discrete',
    'temperature_230509_discrete',
    ]
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()
```

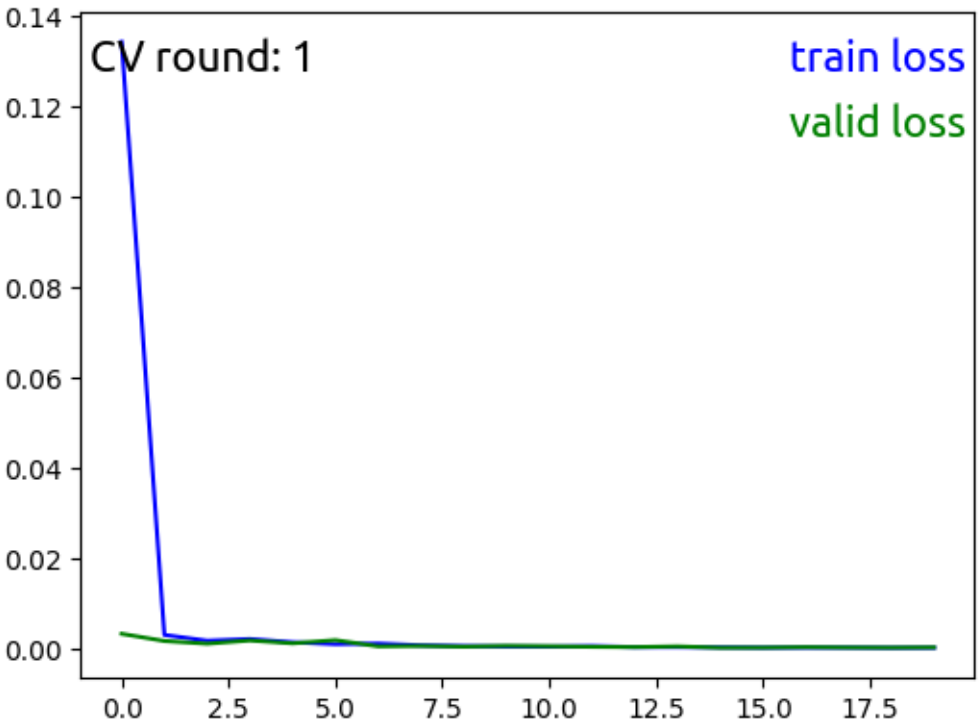
```
__________CROSS VALIDATION__________
Cross-validation rounds: 16
Epochs: 1000
Datas to learn:
        0: pressure_230516_discrete
        1: temperature_230509_discrete
MULTI TASK, Sequential_____________________________
we're learning: multiple tasks
given [1, 2, 3], [a, b, c]: learn [1, 2, 3], reset model, learn [a, b, c]
CV round 0_________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 22
min train loss: 0.00015338973078707403
min valid loss: 0.000156893212988507
```



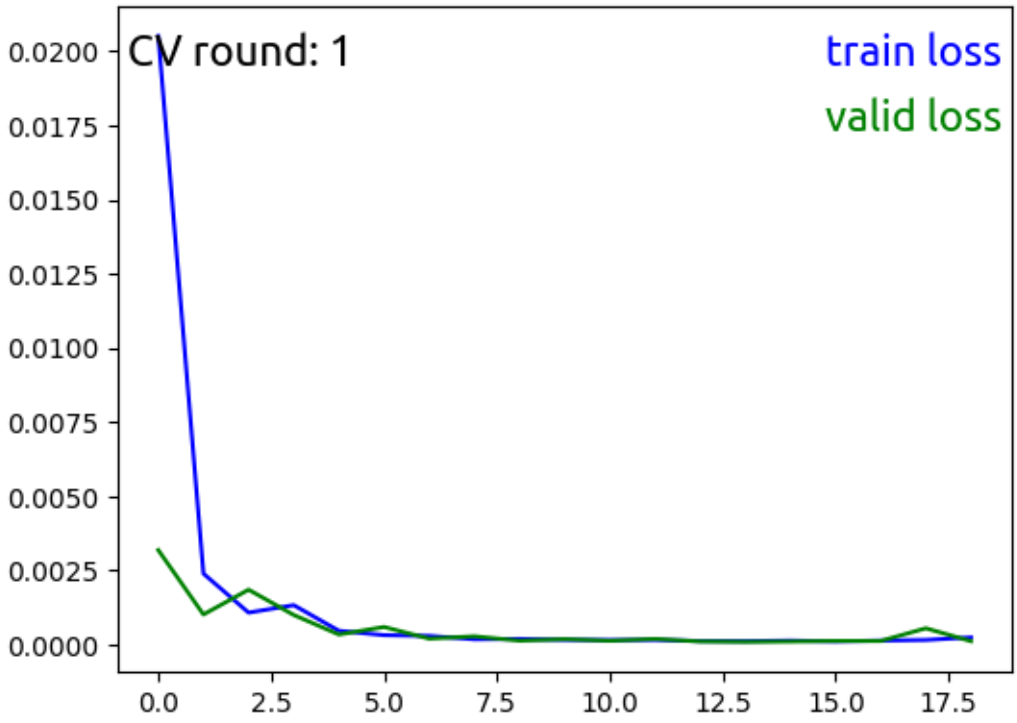

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 19
min train loss: 8.673029994745527e-05
min valid loss: 9.712287501315587e-05
```



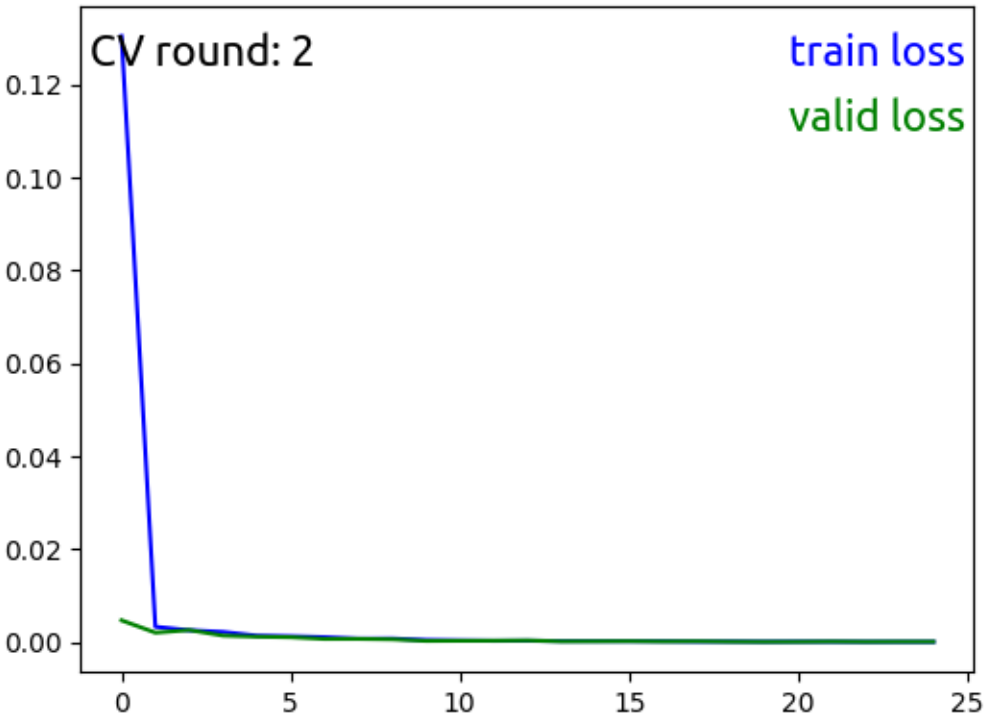

```
CV round 1_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 19
min train loss: 0.00013655740450221028
min valid loss: 0.00016044478252297267
```



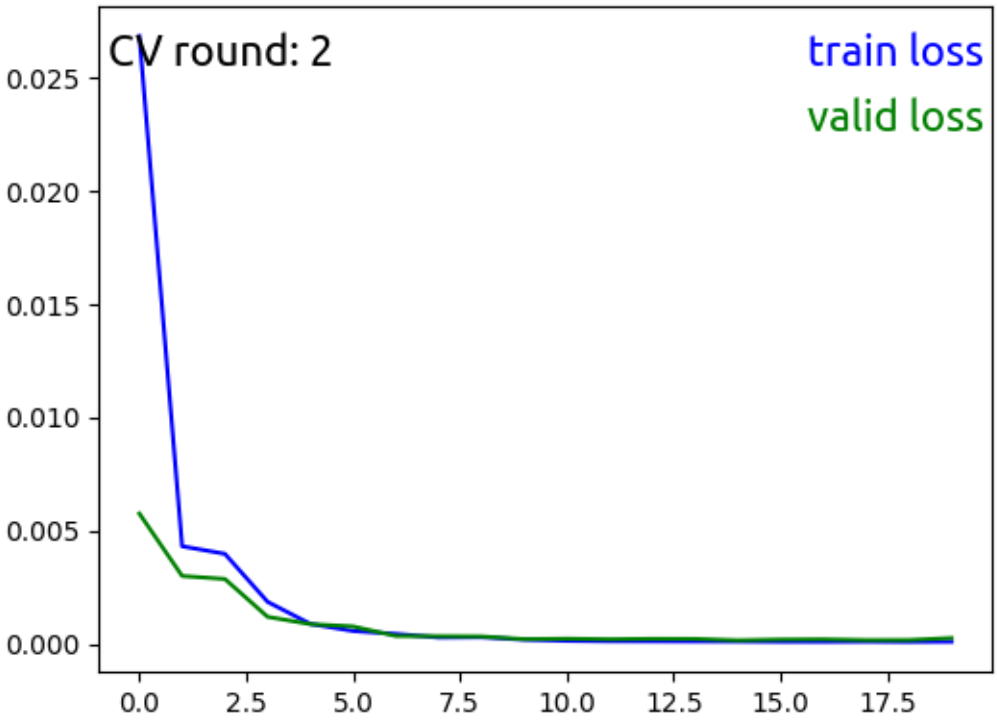

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 18
min train loss: 0.0001100779734384339
min valid loss: 9.343566925963387e-05
```



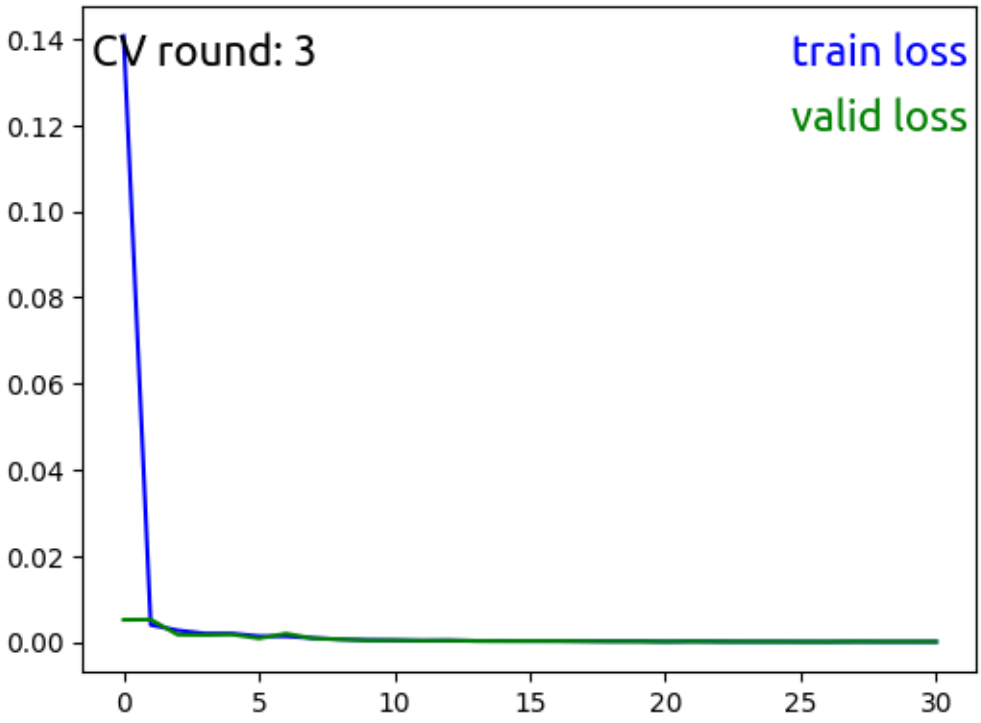

```
CV round 2_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 24
min train loss: 9.524696843899702e-05
min valid loss: 0.00010031880265159998
```



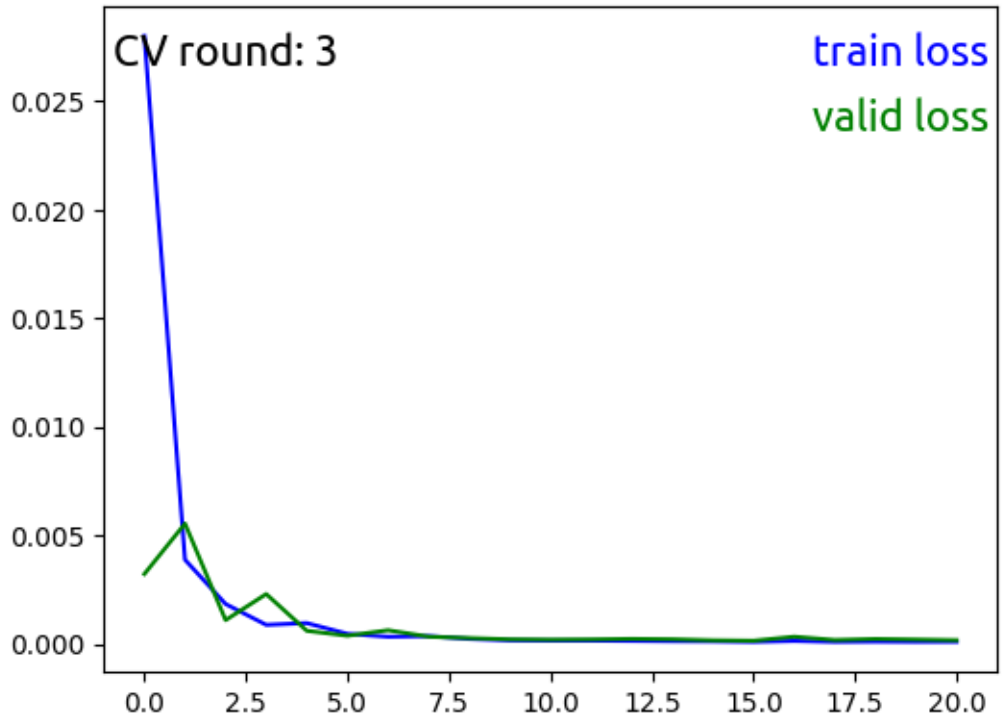

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 19
min train loss: 9.717244459104471e-05
min valid loss: 0.00016462342682643794
```



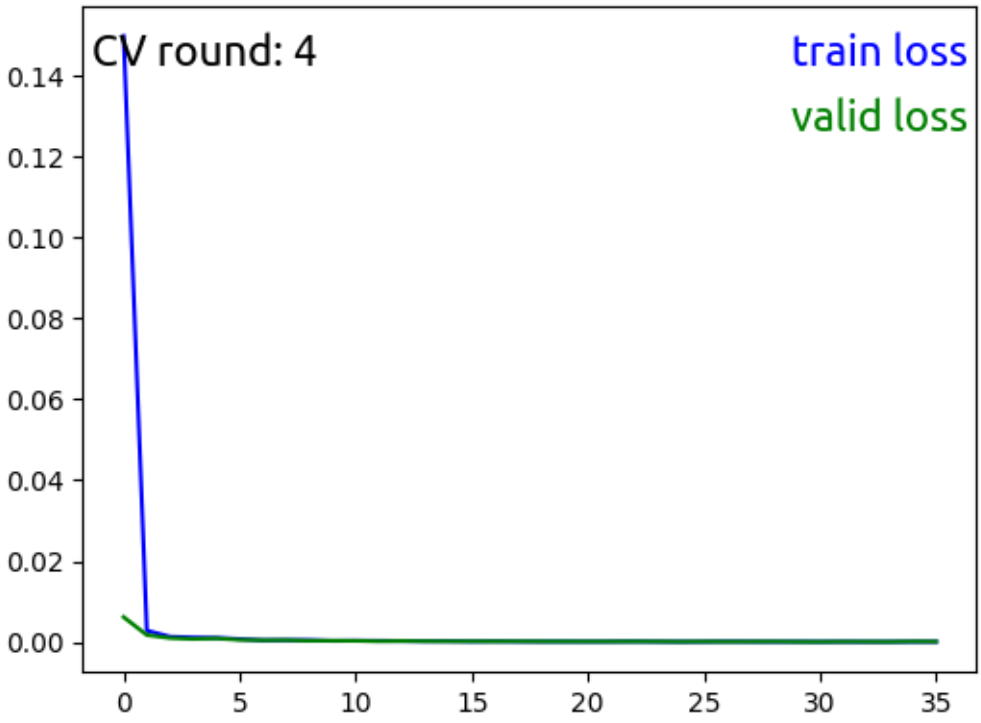

```
CV round 3_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 30
min train loss: 0.00010629379844017835
min valid loss: 9.568419136485318e-05
```



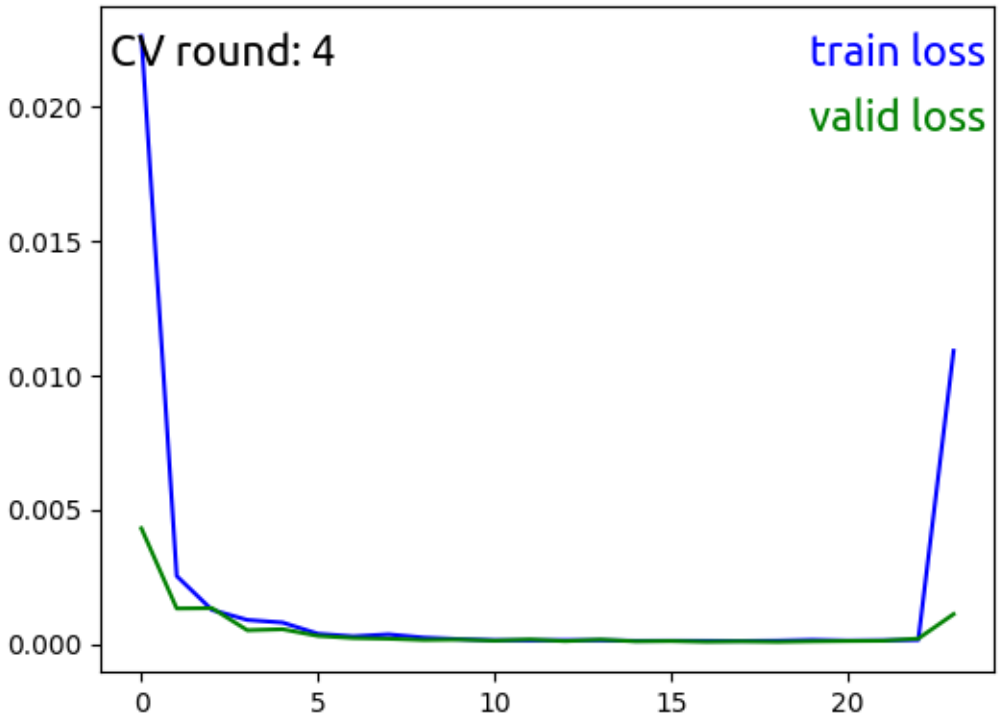

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 20
min train loss: 0.00010935473614098913
min valid loss: 0.00016144771580002272
```



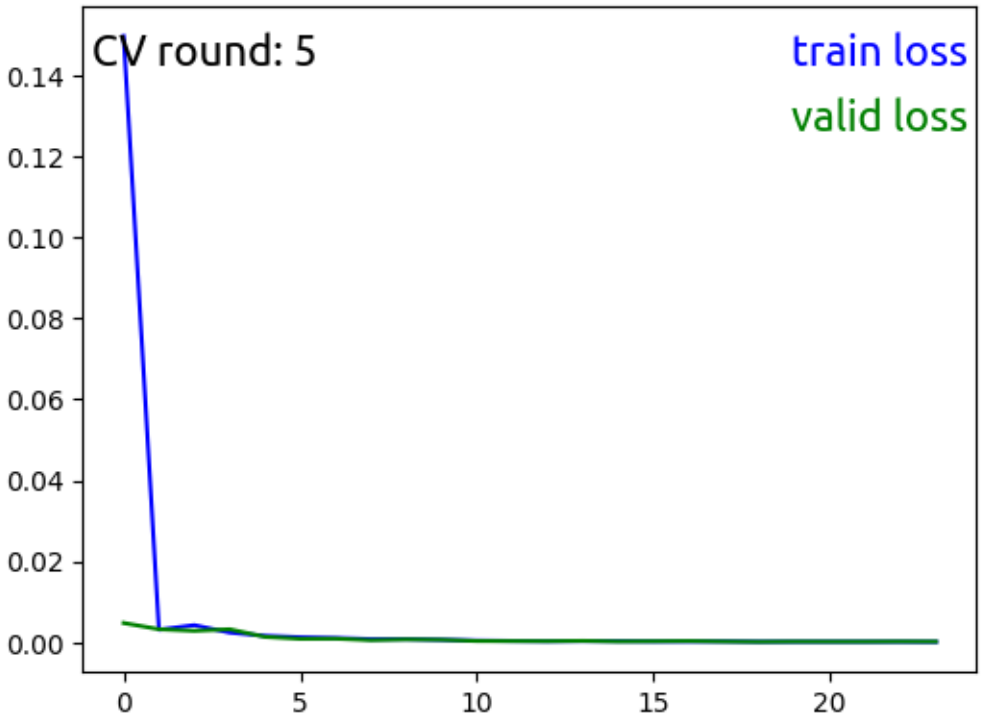

```
CV round 4_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 35
min train loss: 7.202425543007187e-05
min valid loss: 6.571205813088454e-05
```



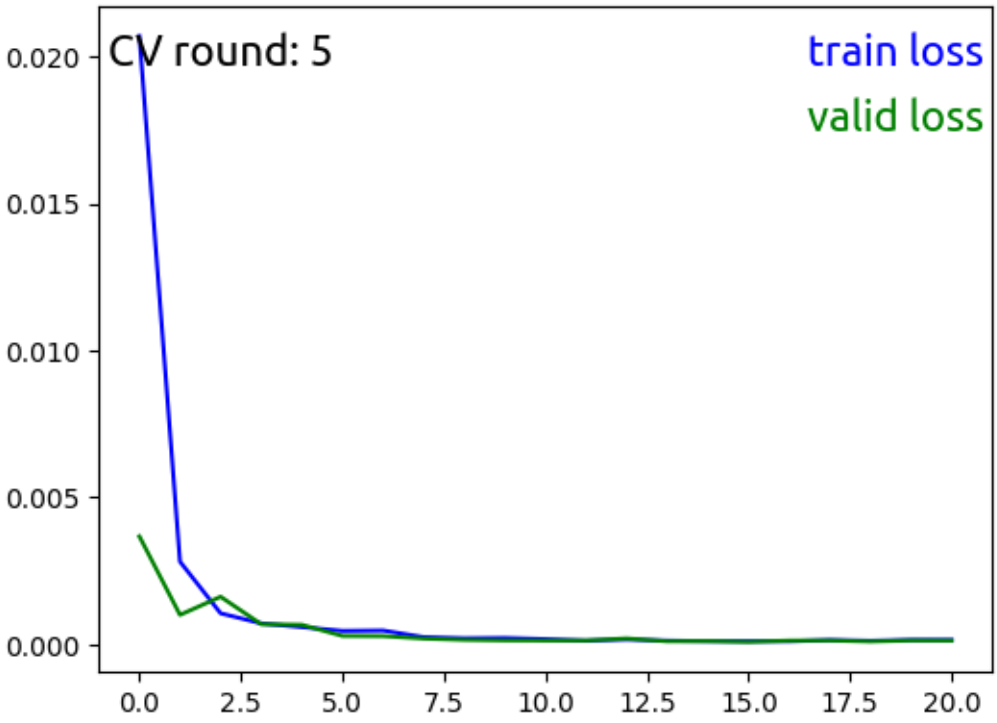

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 23
min train loss: 0.00011279785069222491
min valid loss: 7.879095828684512e-05
```



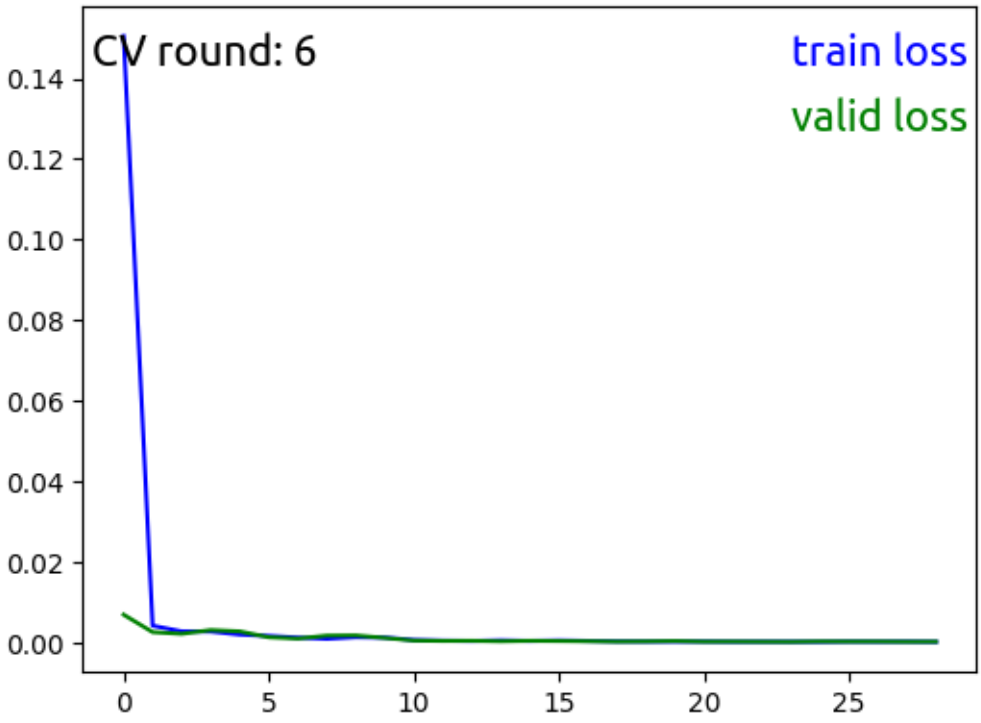

```
CV round 5_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 23
min train loss: 0.00012860284782205284
min valid loss: 0.00013803624278807547
```



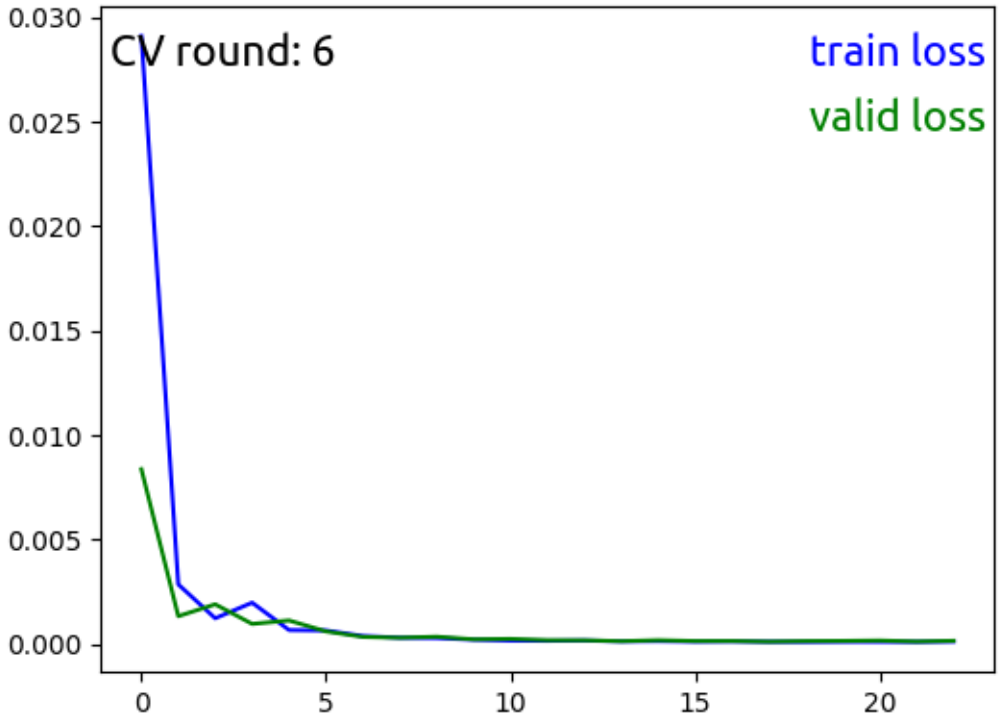

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 20
min train loss: 0.00010244422749868438
min valid loss: 8.235229906858877e-05
```



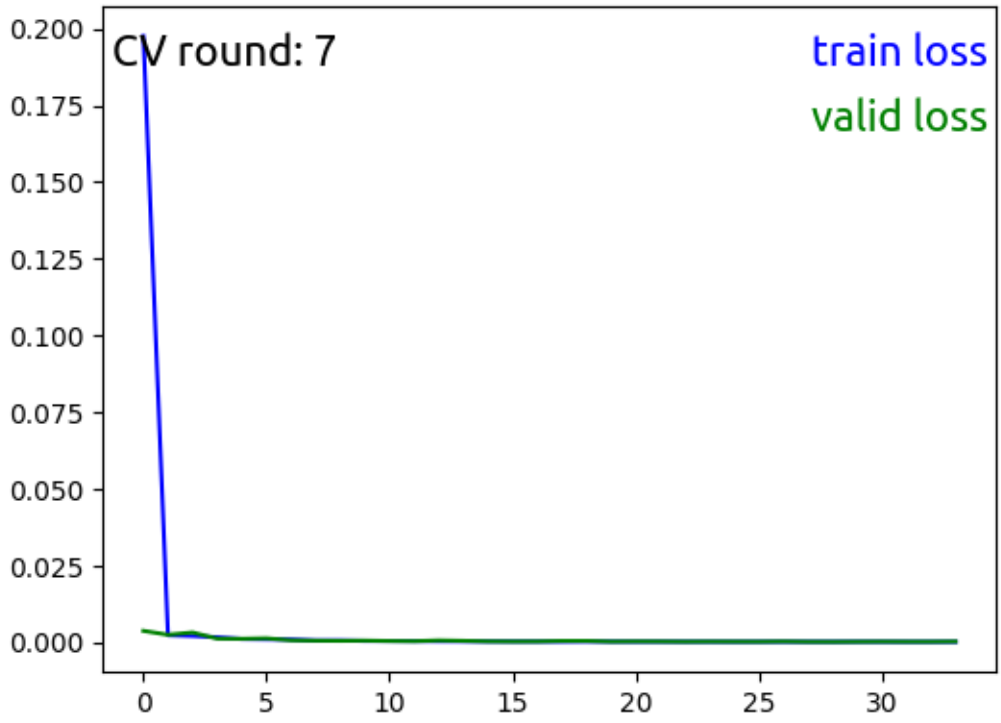

```
CV round 6_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 28
min train loss: 0.00013557465241650457
min valid loss: 0.00013874529395252466
```



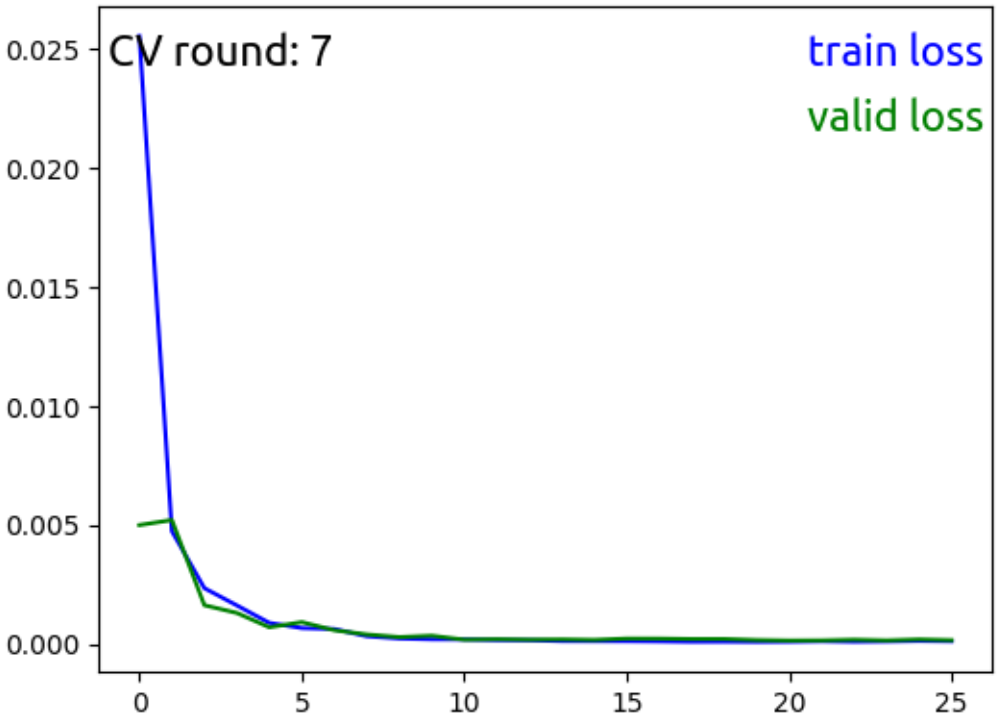

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 22
min train loss: 0.0001052269343001006
min valid loss: 0.00011327184911351651
```



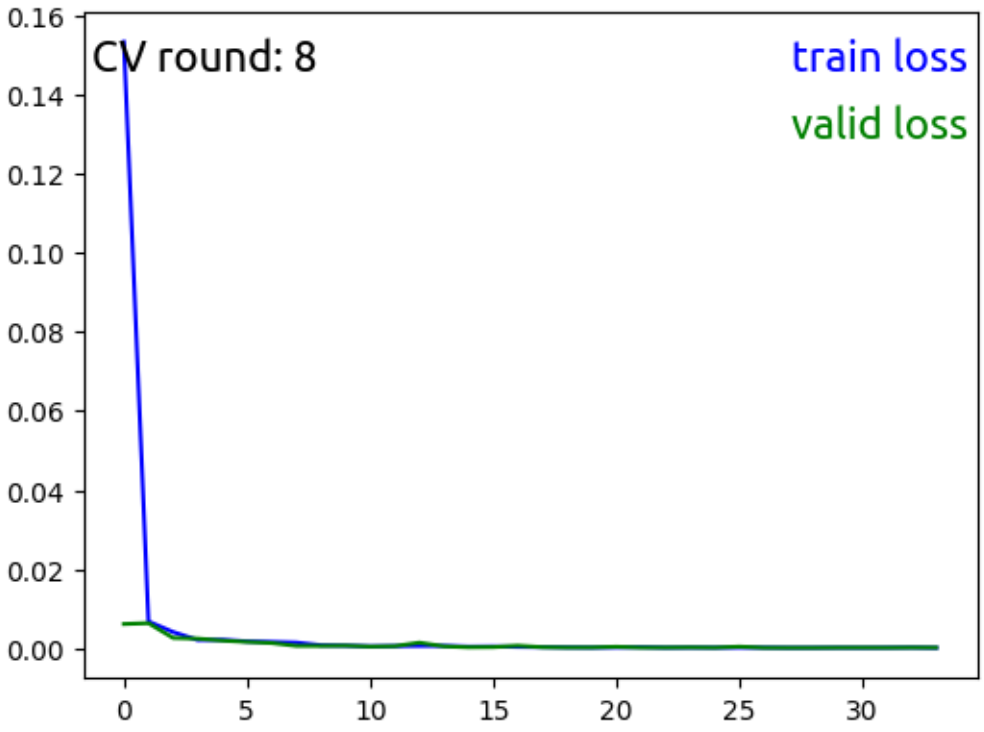

```
CV round 7_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 33
min train loss: 9.623649093555286e-05
min valid loss: 8.215576690417947e-05
```



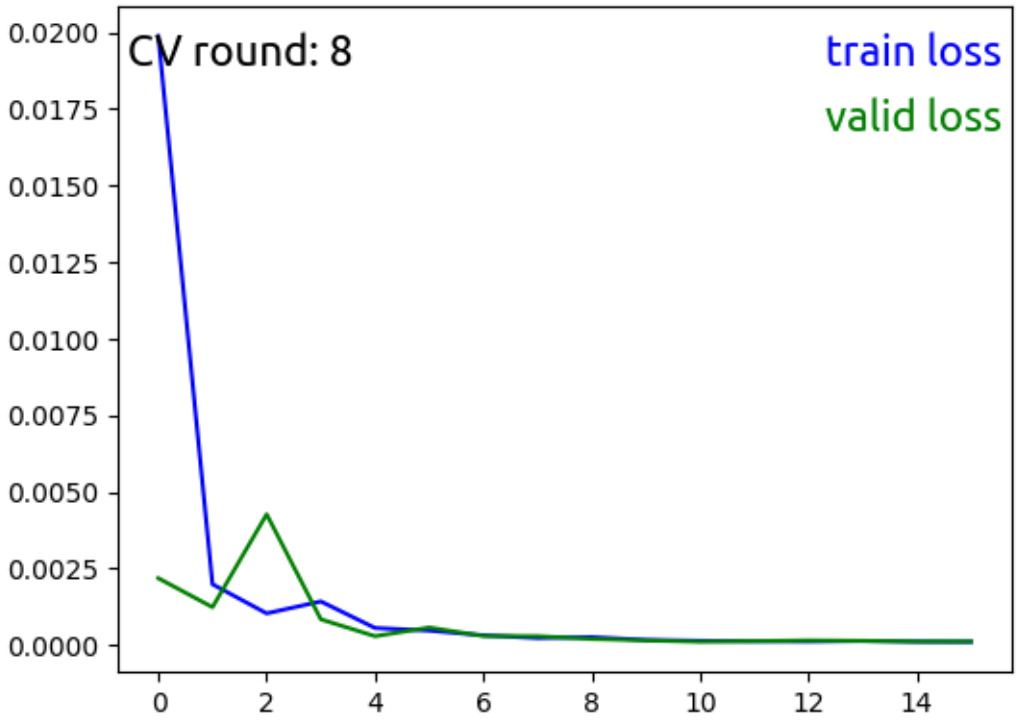

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 25
min train loss: 8.508955232338684e-05
min valid loss: 0.00014047290133021307
```



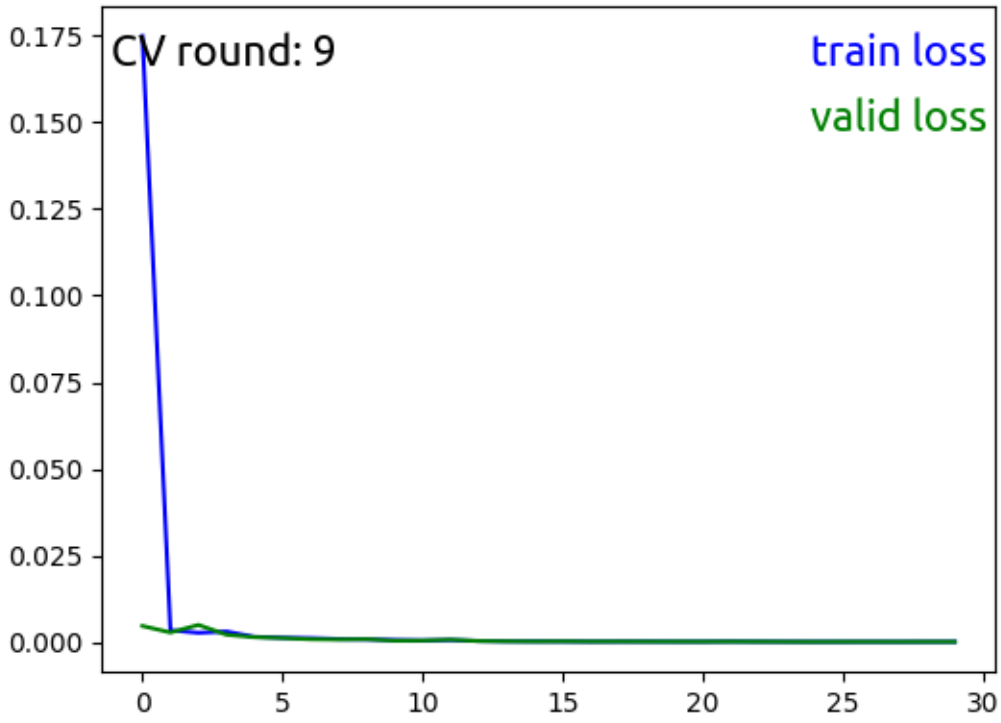

```
CV round 8_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 33
min train loss: 0.00011660323295721107
min valid loss: 0.00012768484612024622
```



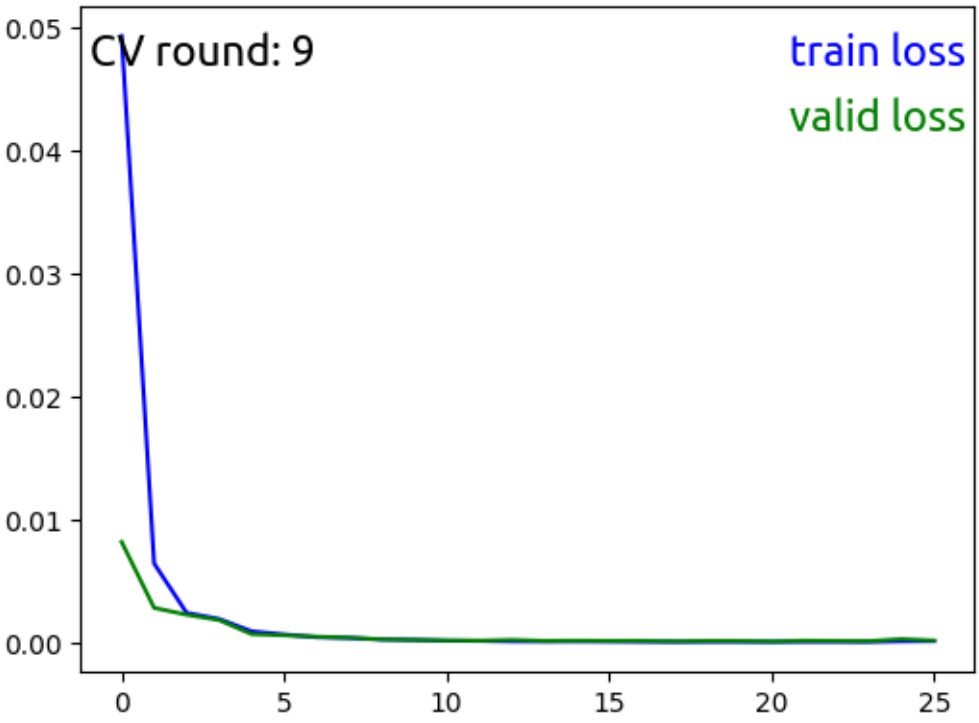

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 15
min train loss: 0.00010244684265423778
min valid loss: 0.00010679404440452344
```



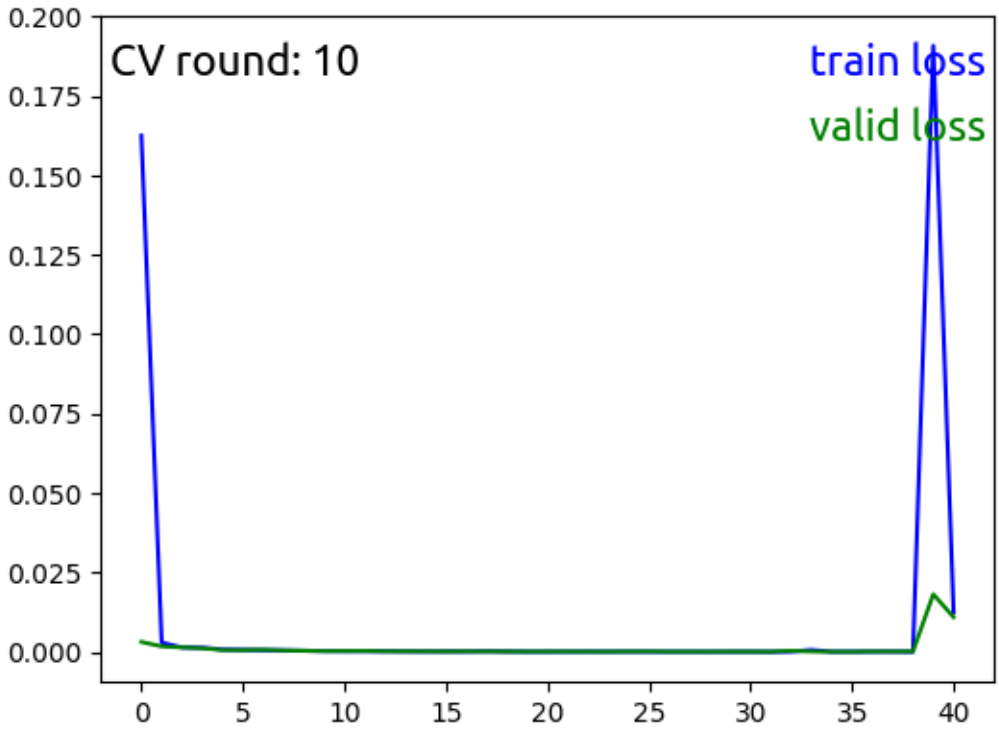

```
CV round 9_________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 29
min train loss: 9.543068398753265e-05
min valid loss: 8.861701462592464e-05
```



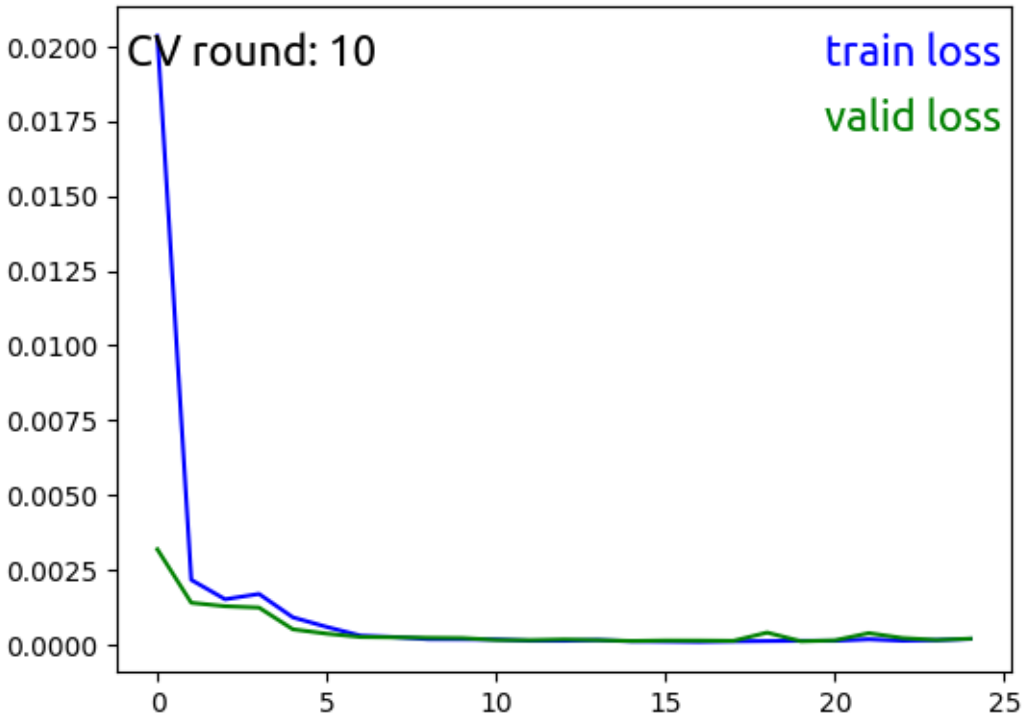

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 25
min train loss: 0.0001141297097175001
min valid loss: 0.00014108062241575682
```



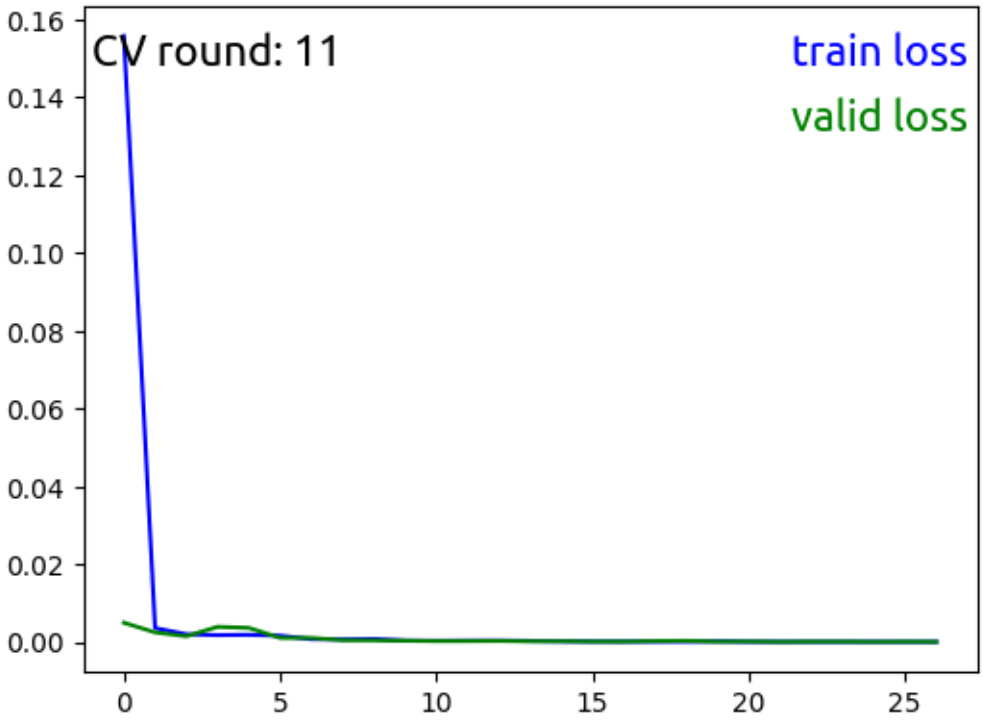

```
CV round 10_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 40
min train loss: 6.66731201239269e-05
min valid loss: 6.567424543391098e-05
```



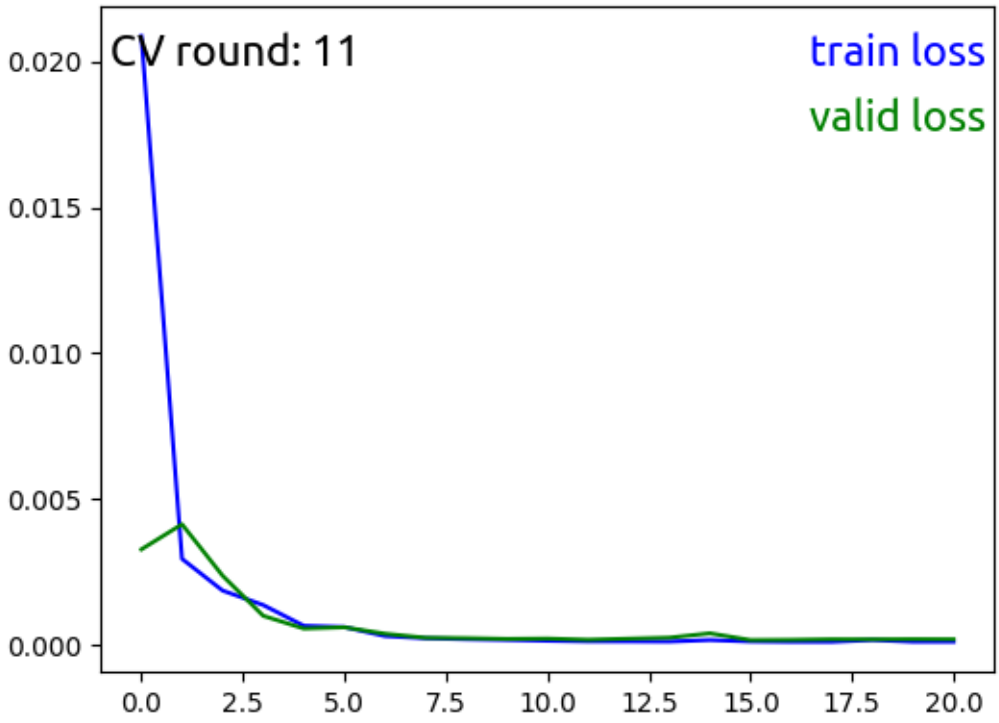

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 24
min train loss: 9.896838513889111e-05
min valid loss: 0.0001184172673674766
```



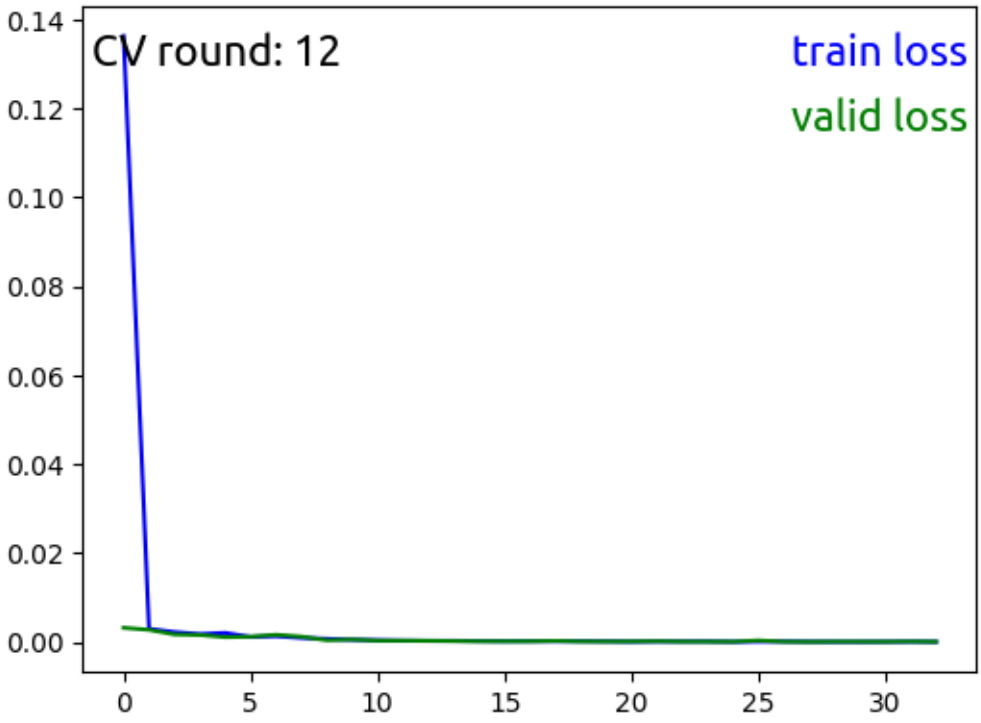

```
CV round 11_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 26
min train loss: 0.00011198571473042565
min valid loss: 0.00010577633838693146
```



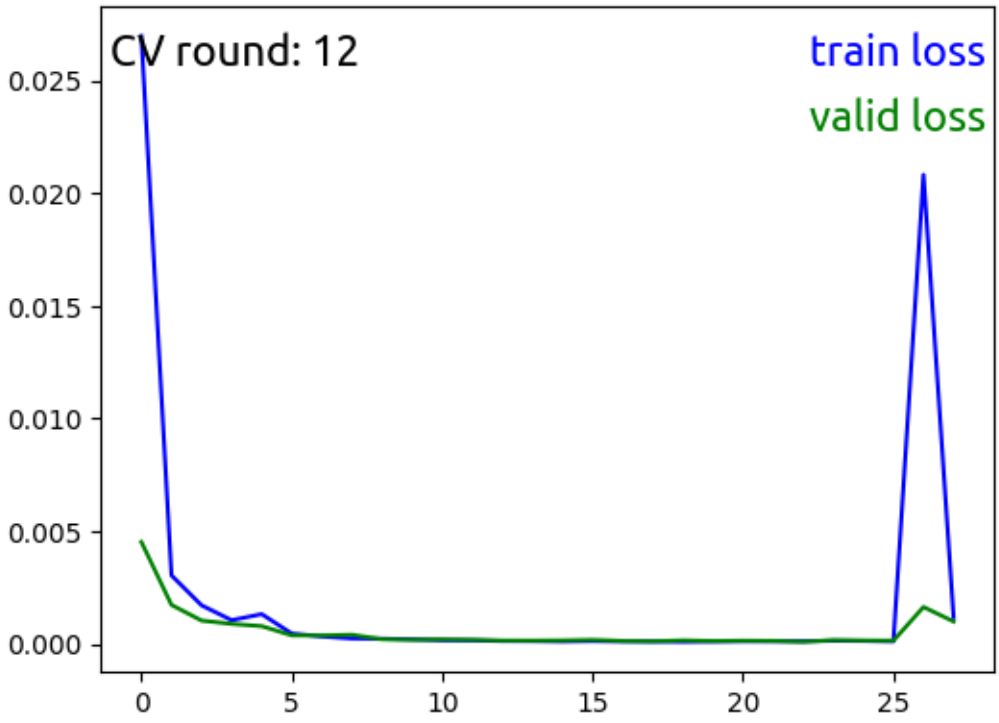

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 20
min train loss: 0.00011244014488263268
min valid loss: 0.00017353292496409268
```



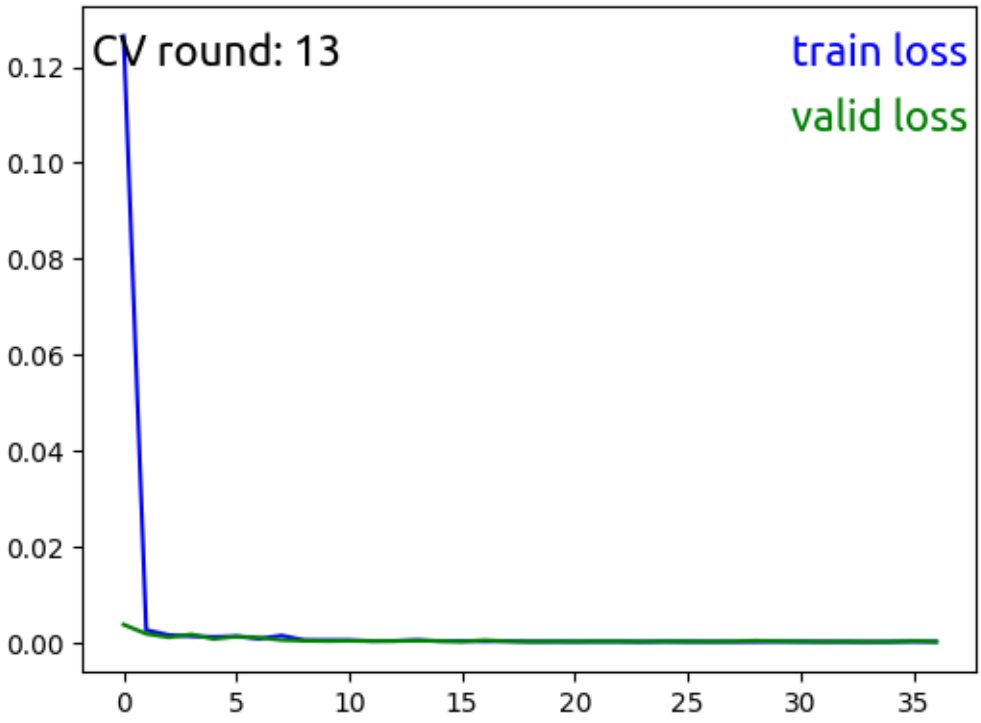

```
CV round 12_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 32
min train loss: 9.823169543365524e-05
min valid loss: 9.718721776152961e-05
```



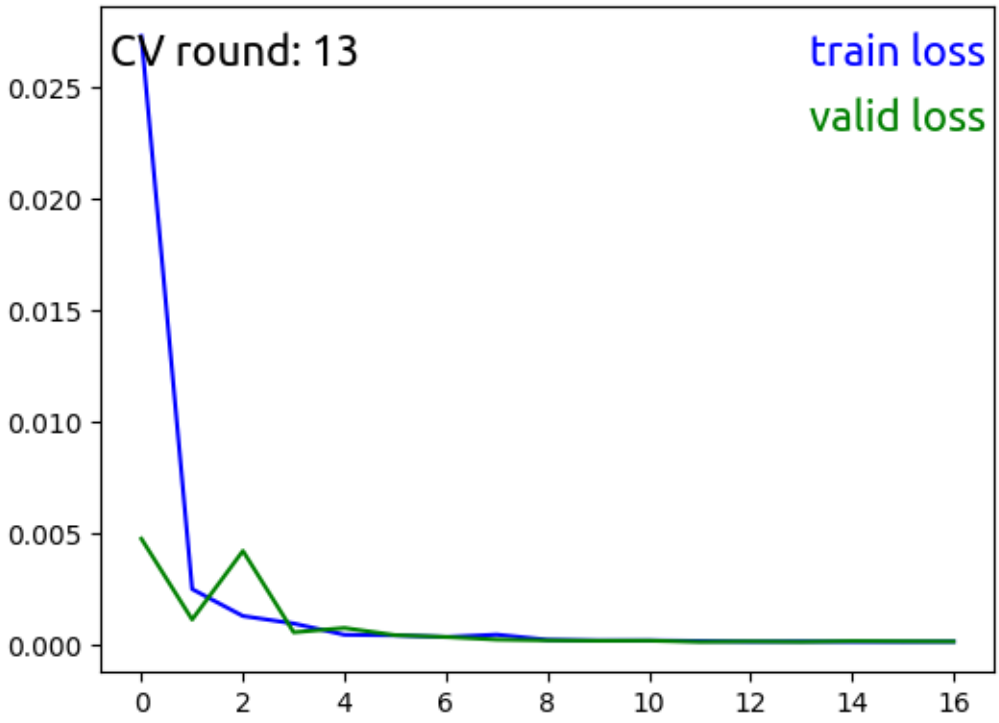

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 27
min train loss: 9.724007781408022e-05
min valid loss: 9.350497311970685e-05
```



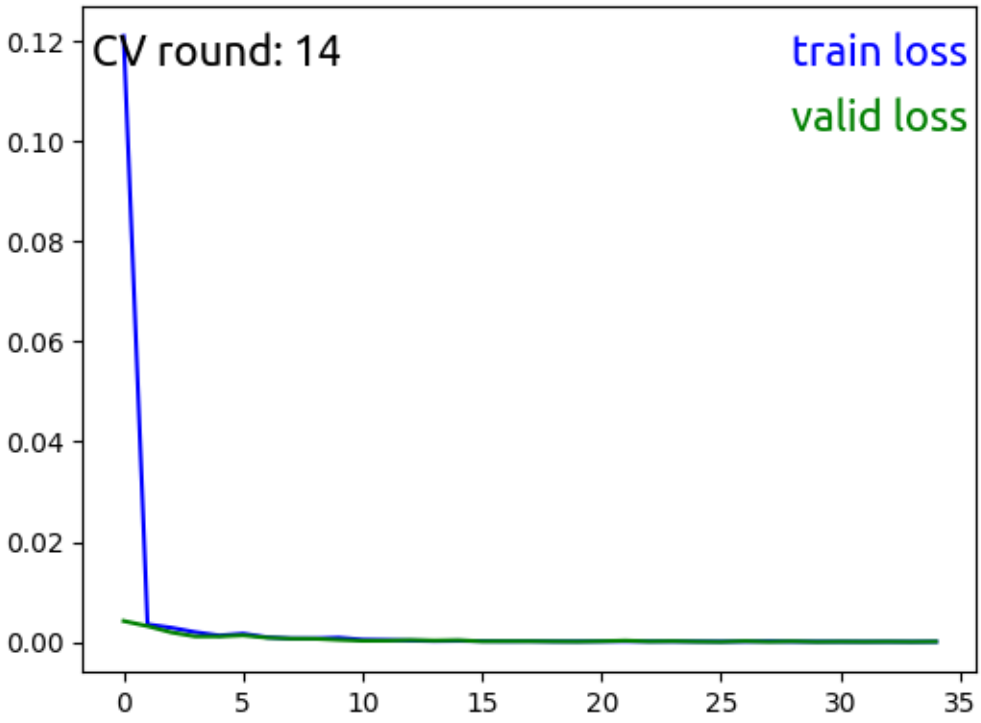

```
CV round 13_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 36
min train loss: 0.0001021394492867826
min valid loss: 0.00010341979941586033
```



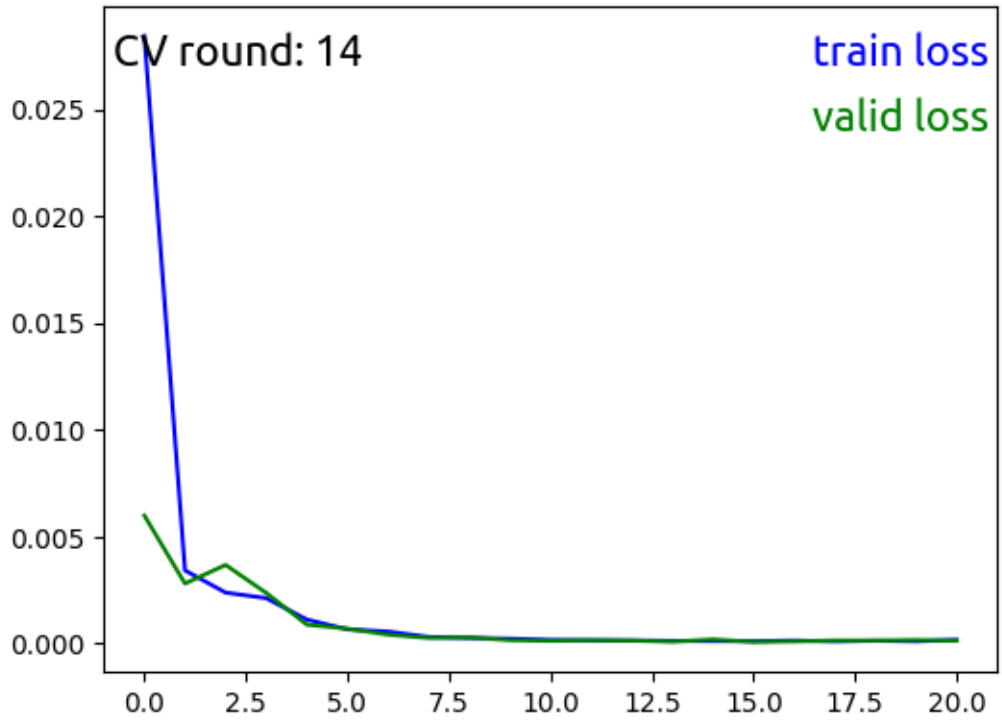

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 16
min train loss: 0.00011673246858249927
min valid loss: 0.00011114565495518036
```



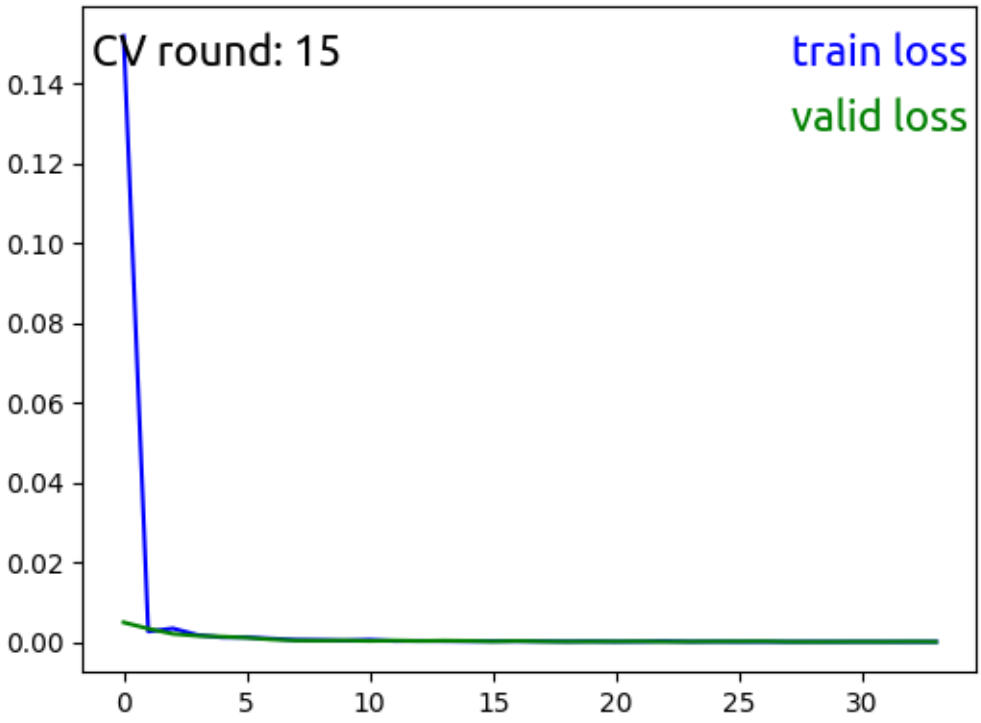

```
CV round 14_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 34
min train loss: 0.00010302857593739066
min valid loss: 8.608356893091695e-05
```



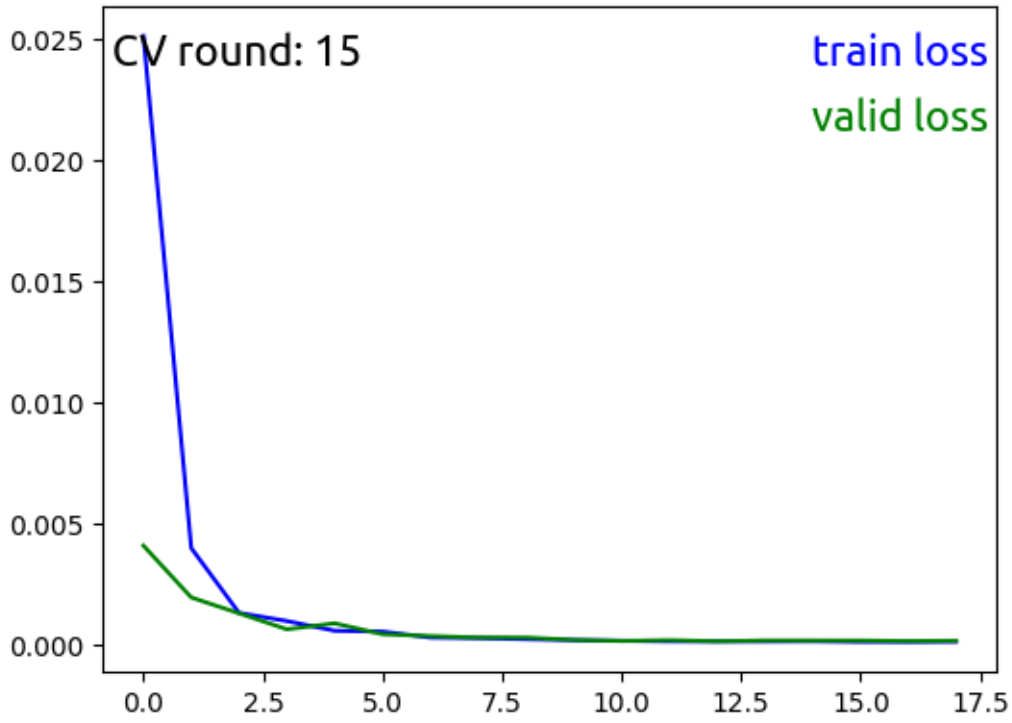

```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 20
min train loss: 9.928515933235317e-05
min valid loss: 7.691397404414601e-05
```




```
CV round 15_____________________________________
using: 0 pressure_230516_discrete
EARLY STOPPING @ epoch 33
min train loss: 8.143846544871022e-05
min valid loss: 8.554023861506721e-05
```




```
using: 1 temperature_230509_discrete
EARLY STOPPING @ epoch 17
min train loss: 0.00010983232316379365
min valid loss: 0.00013360231314436534
```




```
BEST model: CV=14.pth with 7.691397404414601e-05
trained datas sequentially
Aggregate performance: yo
pressure_230516_discrete: Valid loss mean 0.00010612335128712402, std
2.8811074954603744e-05
temperature_230509_discrete: Valid loss mean 0.00011790684181960386, std
3.0369510352206845e-05
  TRAINing COMPLETE_____________________________
TEST_____________________________
Testing pressure_230516_discrete, loss:  4.161747932434082
Testing temperature_230509_discrete, loss:  0.00010918031674871025
```