lab8q1

March 11, 2025

```python
[5]: import torch
     import torch.nn as nn
     from torch.utils.data import Dataset, DataLoader, RandomSampler
     from torch.utils.tensorboard import SummaryWriter

     import pandas as pd
     from tqdm.notebook import tqdm

     import matplotlib.pyplot as plt
```

```python
[11]: df = pd.read_csv('/home/student/Desktop/220962049_aiml/daily_csv.csv')
      df['Price'].interpolate(method='linear', inplace=True)

      prices = torch.Tensor(df['Price'].values)
      prices = (prices - prices.min()) / (prices.max() - prices.min())


      n = int(0.75 * len(prices))
      train, test = prices[:n], prices[n:]
```

```
/tmp/ipykernel_7615/1615506271.py:2: FutureWarning: A value is trying to be set
on a copy of a DataFrame or Series through chained assignment using an inplace
method.
The behavior will change in pandas 3.0. This inplace method will never work
because the intermediate object on which we are setting values always behaves as
a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using
'df.method({col: value}, inplace=True)' or df[col] = df[col].method(value)
instead, to perform the operation inplace on the original object.


  df['Price'].interpolate(method='linear', inplace=True)
```

```python
[13]: class TimeSeriesDataset(Dataset):

          def __init__(self, series, seq_length=10, device="cpu"):
              self.series = series
```

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```
            self.seq_length = seq_length

    def __len__(self):
        return len(self.series) - self.seq_length - 1

    def __getitem__(self, idx):
        X = self.series[idx:idx+self.seq_length].reshape(self.seq_length, -1)
        y = self.series[idx+self.seq_length]

        return X, y
```

[14]:
```
train_dataset = TimeSeriesDataset(train, seq_length=10)
test_dataset = TimeSeriesDataset(test, seq_length=10)
train_data = DataLoader(train_dataset, batch_size=256, shuffle=True)
test_data = DataLoader(test_dataset, batch_size=1, shuffle=False)
```

[15]:
```
class RNN(nn.Module):

    def __init__(self, input_size, hidden_size):

        super(RNN, self).__init__()
        self.rnn = nn.RNN(input_size, hidden_size, batch_first=True)
        self.fc = nn.Sequential(
            nn.ReLU(),
            nn.Linear(in_features=hidden_size, out_features=1),
        )

    def forward(self, x):
        output, status = self.rnn(x)
        output = output[:, -1, :]
        output = self.fc(output)

        return output
```

[16]:
```
input_size = 1
hidden_size = 5
learning_rate = 1e-4
num_epochs = 1500

model = RNN(input_size, hidden_size)

criterion = nn.MSELoss()
optimizer = torch.optim.Adam(model.parameters(), lr=learning_rate)
```

[24]:
```
for epoch in range(num_epochs):
    print(f"Epoch {epoch+1}/{num_epochs}")  # Print progress manually
```

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```python
    for i, (batch, targets) in enumerate(train_data):
        outs = model(batch).reshape(-1)

        optimizer.zero_grad()
        loss = criterion(outs, targets)
        loss.backward()
        optimizer.step()

        # Print progress for every 10th batch (optional)
        if i % 10 == 0:
            print(f"  Batch {i+1}/{len(train_data)}, Loss: {loss.item()}")

    if epoch % 50 == 0:
        print(f"After epoch {epoch}, loss={loss.item()}")
```

```
Epoch 1/1500
  Batch 1/18, Loss: 0.11919968575239182
  Batch 11/18, Loss: 0.12547309696674347
After epoch 0, loss=0.13013996183872223
Epoch 2/1500
  Batch 1/18, Loss: 0.12171542644500732
  Batch 11/18, Loss: 0.1268751472234726
Epoch 3/1500
  Batch 1/18, Loss: 0.11319871991872787
  Batch 11/18, Loss: 0.11807101964950562

Exception ignored in: <function tqdm.__del__ at 0x7b7bac2d1440>
Traceback (most recent call last):
  File "/home/student/Desktop/220962049_aiml/.venv/lib/python3.12/site-
packages/tqdm/std.py", line 1148, in __del__
    self.close()
  File "/home/student/Desktop/220962049_aiml/.venv/lib/python3.12/site-
packages/tqdm/notebook.py", line 279, in close
    self.disp(bar_style='danger', check_delay=False)
    ^^^^^^^^^
AttributeError: 'tqdm_notebook' object has no attribute 'disp'
Exception ignored in: <function tqdm.__del__ at 0x7b7bac2d1440>
Traceback (most recent call last):
  File "/home/student/Desktop/220962049_aiml/.venv/lib/python3.12/site-
packages/tqdm/std.py", line 1148, in __del__
    self.close()
  File "/home/student/Desktop/220962049_aiml/.venv/lib/python3.12/site-
packages/tqdm/notebook.py", line 279, in close
    self.disp(bar_style='danger', check_delay=False)
    ^^^^^^^^^
AttributeError: 'tqdm_notebook' object has no attribute 'disp'
Exception ignored in: <function tqdm.__del__ at 0x7b7bac2d1440>
Traceback (most recent call last):
```

```
  File "/home/student/Desktop/220962049_aiml/.venv/lib/python3.12/site-
packages/tqdm/std.py", line 1148, in __del__
    self.close()
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packages/tqdm/notebook.py", line 279, in close
    self.disp(bar_style='danger', check_delay=False)
    ^^^^^^^^^
AttributeError: 'tqdm_notebook' object has no attribute 'disp'

Epoch 4/1500
  Batch 1/18, Loss: 0.09817495942115784
  Batch 11/18, Loss: 0.09976417571306229
Epoch 5/1500
  Batch 1/18, Loss: 0.10425276309251785
  Batch 11/18, Loss: 0.10317812860012054
Epoch 6/1500
  Batch 1/18, Loss: 0.10056265443563461
  Batch 11/18, Loss: 0.08929745107889175
Epoch 7/1500
  Batch 1/18, Loss: 0.08626741915941238
  Batch 11/18, Loss: 0.08390000462532043
Epoch 8/1500
  Batch 1/18, Loss: 0.0923704281449318
  Batch 11/18, Loss: 0.08358245342969894
Epoch 9/1500
  Batch 1/18, Loss: 0.0924082100391388
  Batch 11/18, Loss: 0.07853900641202927
Epoch 10/1500
  Batch 1/18, Loss: 0.07400530576705933
  Batch 11/18, Loss: 0.07850398123264313
Epoch 11/1500
  Batch 1/18, Loss: 0.07112006843090057
  Batch 11/18, Loss: 0.08380073308944702
Epoch 12/1500
  Batch 1/18, Loss: 0.07653547078371048
  Batch 11/18, Loss: 0.0697365403175354
Epoch 13/1500
  Batch 1/18, Loss: 0.06071791052818298
  Batch 11/18, Loss: 0.06842710822820663
Epoch 14/1500
  Batch 1/18, Loss: 0.061407480388879776
  Batch 11/18, Loss: 0.06432634592056274
Epoch 15/1500
  Batch 1/18, Loss: 0.06364810466766357
  Batch 11/18, Loss: 0.05794809013605118
Epoch 16/1500
  Batch 1/18, Loss: 0.059926629066467285
  Batch 11/18, Loss: 0.057737745344638824
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Epoch 17/1500
  Batch 1/18, Loss: 0.053283706307411194
  Batch 11/18, Loss: 0.05210249125957489
Epoch 18/1500
  Batch 1/18, Loss: 0.04901367798447609
  Batch 11/18, Loss: 0.04667329415678978
Epoch 19/1500
  Batch 1/18, Loss: 0.047378674149513245
  Batch 11/18, Loss: 0.047123752534389496
Epoch 20/1500
  Batch 1/18, Loss: 0.053435590118169785
  Batch 11/18, Loss: 0.04450052231550217
Epoch 21/1500
  Batch 1/18, Loss: 0.04419125244021416
  Batch 11/18, Loss: 0.054750747978687286
Epoch 22/1500
  Batch 1/18, Loss: 0.037631865590810776
  Batch 11/18, Loss: 0.0428951159119606
Epoch 23/1500
  Batch 1/18, Loss: 0.040530793368816376
  Batch 11/18, Loss: 0.037300579249858856
Epoch 24/1500
  Batch 1/18, Loss: 0.036558955907821655
  Batch 11/18, Loss: 0.0347294919192791
Epoch 25/1500
  Batch 1/18, Loss: 0.03782539814710617
  Batch 11/18, Loss: 0.030268365517258644
Epoch 26/1500
  Batch 1/18, Loss: 0.02717006951570511
  Batch 11/18, Loss: 0.03691656142473221
Epoch 27/1500
  Batch 1/18, Loss: 0.03258352726697922
  Batch 11/18, Loss: 0.03820253908634186
Epoch 28/1500
  Batch 1/18, Loss: 0.029631100594997406
  Batch 11/18, Loss: 0.03200201690196991
Epoch 29/1500
  Batch 1/18, Loss: 0.028743473812937737
  Batch 11/18, Loss: 0.03519726172089577
Epoch 30/1500
  Batch 1/18, Loss: 0.03279673680663109
  Batch 11/18, Loss: 0.02471812628209591
Epoch 31/1500
  Batch 1/18, Loss: 0.02542589232325554
  Batch 11/18, Loss: 0.0247404575347904
Epoch 32/1500
  Batch 1/18, Loss: 0.025412149727344513
  Batch 11/18, Loss: 0.025915689766407013
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Epoch 33/1500
  Batch 1/18, Loss: 0.019508862867951393
  Batch 11/18, Loss: 0.026622992008924484
Epoch 34/1500
  Batch 1/18, Loss: 0.023906612768769264
  Batch 11/18, Loss: 0.02518554963171482
Epoch 35/1500
  Batch 1/18, Loss: 0.025886747986078262
  Batch 11/18, Loss: 0.024156460538506508
Epoch 36/1500
  Batch 1/18, Loss: 0.01731586456298828
  Batch 11/18, Loss: 0.02379436418414116
Epoch 37/1500
  Batch 1/18, Loss: 0.021683717146515846
  Batch 11/18, Loss: 0.01944255270063877
Epoch 38/1500
  Batch 1/18, Loss: 0.016953034326434135
  Batch 11/18, Loss: 0.016294317319989204
Epoch 39/1500
  Batch 1/18, Loss: 0.02054603025317192
  Batch 11/18, Loss: 0.017653122544288635
Epoch 40/1500
  Batch 1/18, Loss: 0.019178839400410652
  Batch 11/18, Loss: 0.01413517165929079
Epoch 41/1500
  Batch 1/18, Loss: 0.015517916530370712
  Batch 11/18, Loss: 0.021069487556815147
Epoch 42/1500
  Batch 1/18, Loss: 0.01886022463440895
  Batch 11/18, Loss: 0.019275791943073273
Epoch 43/1500
  Batch 1/18, Loss: 0.01688254624605179
  Batch 11/18, Loss: 0.014284031465649605
Epoch 44/1500
  Batch 1/18, Loss: 0.01702880673110485
  Batch 11/18, Loss: 0.018474156036973
Epoch 45/1500
  Batch 1/18, Loss: 0.019343214109539986
  Batch 11/18, Loss: 0.016045227646827698
Epoch 46/1500
  Batch 1/18, Loss: 0.01638827659189701
  Batch 11/18, Loss: 0.018140176311135292
Epoch 47/1500
  Batch 1/18, Loss: 0.016614582389593124
  Batch 11/18, Loss: 0.012501448392868042
Epoch 48/1500
  Batch 1/18, Loss: 0.015583965927362442
  Batch 11/18, Loss: 0.01431602519005537
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Epoch 49/1500
  Batch 1/18, Loss: 0.012752596288919449
  Batch 11/18, Loss: 0.015753500163555145
Epoch 50/1500
  Batch 1/18, Loss: 0.013168396428227425
  Batch 11/18, Loss: 0.01829461008310318
Epoch 51/1500
  Batch 1/18, Loss: 0.0163740087300539
  Batch 11/18, Loss: 0.012756677344441414
After epoch 50, loss=0.019850116223096848
Epoch 52/1500
  Batch 1/18, Loss: 0.012755004689097404
  Batch 11/18, Loss: 0.010837454348802567
Epoch 53/1500
  Batch 1/18, Loss: 0.015869414433836937
  Batch 11/18, Loss: 0.012739839032292366
Epoch 54/1500
  Batch 1/18, Loss: 0.015940586104989052
  Batch 11/18, Loss: 0.015530644915997982
Epoch 55/1500
  Batch 1/18, Loss: 0.016219688579440117
  Batch 11/18, Loss: 0.011217596009373665
Epoch 56/1500
  Batch 1/18, Loss: 0.012657753191888332
  Batch 11/18, Loss: 0.011602073907852173
Epoch 57/1500
  Batch 1/18, Loss: 0.018446695059537888
  Batch 11/18, Loss: 0.01124604232609272
Epoch 58/1500
  Batch 1/18, Loss: 0.014885067008435726
  Batch 11/18, Loss: 0.01330831740051508
Epoch 59/1500
  Batch 1/18, Loss: 0.014627283439040184
  Batch 11/18, Loss: 0.012895794585347176
Epoch 60/1500
  Batch 1/18, Loss: 0.012954301200807095
  Batch 11/18, Loss: 0.011169373989105225
Epoch 61/1500
  Batch 1/18, Loss: 0.013792087323963642
  Batch 11/18, Loss: 0.015446601435542107
Epoch 62/1500
  Batch 1/18, Loss: 0.011029817163944244
  Batch 11/18, Loss: 0.013492543250322342
Epoch 63/1500
  Batch 1/18, Loss: 0.014383373782038689
  Batch 11/18, Loss: 0.009934191592037678
Epoch 64/1500
  Batch 1/18, Loss: 0.012825443409383297
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  Batch 11/18, Loss: 0.013011462986469269
Epoch 65/1500
  Batch 1/18, Loss: 0.014694955199956894
  Batch 11/18, Loss: 0.014913181774318218
Epoch 66/1500
  Batch 1/18, Loss: 0.0129823237657547
  Batch 11/18, Loss: 0.0146065354347229
Epoch 67/1500
  Batch 1/18, Loss: 0.013491916470229626
  Batch 11/18, Loss: 0.012277694419026375
Epoch 68/1500
  Batch 1/18, Loss: 0.011494098231196404
  Batch 11/18, Loss: 0.012782682664692402
Epoch 69/1500
  Batch 1/18, Loss: 0.016101863235235214
  Batch 11/18, Loss: 0.010606858879327774
Epoch 70/1500
  Batch 1/18, Loss: 0.01577851176261902
  Batch 11/18, Loss: 0.011916328221559525
Epoch 71/1500
  Batch 1/18, Loss: 0.012009231373667717
  Batch 11/18, Loss: 0.013654611073434353
Epoch 72/1500
  Batch 1/18, Loss: 0.013032176531851292
  Batch 11/18, Loss: 0.009306224063038826
Epoch 73/1500
  Batch 1/18, Loss: 0.00990939512848854
  Batch 11/18, Loss: 0.01341593824326992
Epoch 74/1500
  Batch 1/18, Loss: 0.011589569970965385
  Batch 11/18, Loss: 0.012754740193486214
Epoch 75/1500
  Batch 1/18, Loss: 0.014301925897598267
  Batch 11/18, Loss: 0.015328848734498024
Epoch 76/1500
  Batch 1/18, Loss: 0.012936324812471867
  Batch 11/18, Loss: 0.01274186559021473
Epoch 77/1500
  Batch 1/18, Loss: 0.00948093831539154
  Batch 11/18, Loss: 0.011729426681995392
Epoch 78/1500
  Batch 1/18, Loss: 0.009572618640959263
  Batch 11/18, Loss: 0.014506825245916843
Epoch 79/1500
  Batch 1/18, Loss: 0.011179560795426369
  Batch 11/18, Loss: 0.010816387832164764
Epoch 80/1500
  Batch 1/18, Loss: 0.01309835072606802
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  Batch 11/18, Loss: 0.01051533967256546
Epoch 81/1500
  Batch 1/18, Loss: 0.011470876634120941
  Batch 11/18, Loss: 0.014126540161669254
Epoch 82/1500
  Batch 1/18, Loss: 0.013375602662563324
  Batch 11/18, Loss: 0.012063518166542053
Epoch 83/1500
  Batch 1/18, Loss: 0.014184627681970596
  Batch 11/18, Loss: 0.014897560700774193
Epoch 84/1500
  Batch 1/18, Loss: 0.011713425628840923
  Batch 11/18, Loss: 0.011640624143183231
Epoch 85/1500
  Batch 1/18, Loss: 0.010660212486982346
  Batch 11/18, Loss: 0.01707529090344906
Epoch 86/1500
  Batch 1/18, Loss: 0.014977613463997841
  Batch 11/18, Loss: 0.012759500183165073
Epoch 87/1500
  Batch 1/18, Loss: 0.013676708564162254
  Batch 11/18, Loss: 0.013046277686953545
Epoch 88/1500
  Batch 1/18, Loss: 0.012334668077528477
  Batch 11/18, Loss: 0.008647289127111435
Epoch 89/1500
  Batch 1/18, Loss: 0.009766926057636738
  Batch 11/18, Loss: 0.012655770406126976
Epoch 90/1500
  Batch 1/18, Loss: 0.01476377248764038
  Batch 11/18, Loss: 0.012897837907075882
Epoch 91/1500
  Batch 1/18, Loss: 0.011674923822283745
  Batch 11/18, Loss: 0.010584375821053982
Epoch 92/1500
  Batch 1/18, Loss: 0.01270223781466484
  Batch 11/18, Loss: 0.011971513740718365
Epoch 93/1500
  Batch 1/18, Loss: 0.01313721388578415
  Batch 11/18, Loss: 0.010498256422579288
Epoch 94/1500
  Batch 1/18, Loss: 0.012029740959405899
  Batch 11/18, Loss: 0.011554841883480549
Epoch 95/1500
  Batch 1/18, Loss: 0.010429956950247288
  Batch 11/18, Loss: 0.012511062435805798
Epoch 96/1500
  Batch 1/18, Loss: 0.011794937774538994
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  Batch 11/18, Loss: 0.011357827112078667
Epoch 97/1500
  Batch 1/18, Loss: 0.010473729111254215
  Batch 11/18, Loss: 0.013740132562816143
Epoch 98/1500
  Batch 1/18, Loss: 0.012176587246358395
  Batch 11/18, Loss: 0.011260493658483028
Epoch 99/1500
  Batch 1/18, Loss: 0.012131910771131516
  Batch 11/18, Loss: 0.01163032092154026
Epoch 100/1500
  Batch 1/18, Loss: 0.010912768542766571
  Batch 11/18, Loss: 0.013794226571917534
Epoch 101/1500
  Batch 1/18, Loss: 0.012865761294960976
  Batch 11/18, Loss: 0.01184086874127388
After epoch 100, loss=0.008248582482337952
Epoch 102/1500
  Batch 1/18, Loss: 0.011897222138941288
  Batch 11/18, Loss: 0.011880390346050262
Epoch 103/1500
  Batch 1/18, Loss: 0.011985288001596928
  Batch 11/18, Loss: 0.01550944335758686
Epoch 104/1500
  Batch 1/18, Loss: 0.01019345223903656
  Batch 11/18, Loss: 0.014187385328114033
Epoch 105/1500
  Batch 1/18, Loss: 0.01017213799059391
  Batch 11/18, Loss: 0.009686053730547428
Epoch 106/1500
  Batch 1/18, Loss: 0.011869095265865326
  Batch 11/18, Loss: 0.011027163825929165
Epoch 107/1500
  Batch 1/18, Loss: 0.01253154780715704
  Batch 11/18, Loss: 0.013632556423544884
Epoch 108/1500
  Batch 1/18, Loss: 0.010645455680787563
  Batch 11/18, Loss: 0.012108558788895607
Epoch 109/1500
  Batch 1/18, Loss: 0.01807514764368534
  Batch 11/18, Loss: 0.008697223849594593
Epoch 110/1500
  Batch 1/18, Loss: 0.012179573066532612
  Batch 11/18, Loss: 0.01028041634708643
Epoch 111/1500
  Batch 1/18, Loss: 0.012585354968905449
  Batch 11/18, Loss: 0.010206323117017746
Epoch 112/1500
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  Batch 1/18, Loss: 0.012438973411917686
  Batch 11/18, Loss: 0.010970111936330795
Epoch 113/1500
  Batch 1/18, Loss: 0.011028694920241833
  Batch 11/18, Loss: 0.010516781359910965
Epoch 114/1500
  Batch 1/18, Loss: 0.011774804443120956
  Batch 11/18, Loss: 0.010645749978721142
Epoch 115/1500
  Batch 1/18, Loss: 0.011291425675153732
  Batch 11/18, Loss: 0.012545233592391014
Epoch 116/1500
  Batch 1/18, Loss: 0.013032741844654083
  Batch 11/18, Loss: 0.00891091674566269
Epoch 117/1500
  Batch 1/18, Loss: 0.01174832321703434
  Batch 11/18, Loss: 0.010439329780638218
Epoch 118/1500
  Batch 1/18, Loss: 0.009797541424632072
  Batch 11/18, Loss: 0.012310435995459557
Epoch 119/1500
  Batch 1/18, Loss: 0.009817964397370815
  Batch 11/18, Loss: 0.009955613873898983
Epoch 120/1500
  Batch 1/18, Loss: 0.013133379630744457
  Batch 11/18, Loss: 0.0110784862190485
Epoch 121/1500
  Batch 1/18, Loss: 0.012091806158423424
  Batch 11/18, Loss: 0.010681312531232834
Epoch 122/1500
  Batch 1/18, Loss: 0.0072570061311125755
  Batch 11/18, Loss: 0.008852193132042885
Epoch 123/1500
  Batch 1/18, Loss: 0.010067836381494999
  Batch 11/18, Loss: 0.010313239879906178
Epoch 124/1500
  Batch 1/18, Loss: 0.009068385697901249
  Batch 11/18, Loss: 0.009043354541063309
Epoch 125/1500
  Batch 1/18, Loss: 0.00832442194223404
  Batch 11/18, Loss: 0.009902918711304665
Epoch 126/1500
  Batch 1/18, Loss: 0.009921468794345856
  Batch 11/18, Loss: 0.0080257598310709
Epoch 127/1500
  Batch 1/18, Loss: 0.010320592671632767
  Batch 11/18, Loss: 0.00951284822076559
Epoch 128/1500
```

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  Batch 1/18, Loss: 0.010476307943463326
  Batch 11/18, Loss: 0.010625478811562061
Epoch 129/1500
  Batch 1/18, Loss: 0.011480502784252167
  Batch 11/18, Loss: 0.011905673891305923
Epoch 130/1500
  Batch 1/18, Loss: 0.011210361495614052
  Batch 11/18, Loss: 0.009853621013462543
Epoch 131/1500
  Batch 1/18, Loss: 0.010110026225447655
  Batch 11/18, Loss: 0.007956698536872864
Epoch 132/1500
  Batch 1/18, Loss: 0.008527816273272038
  Batch 11/18, Loss: 0.00815601460635662
Epoch 133/1500
  Batch 1/18, Loss: 0.009730497375130653
  Batch 11/18, Loss: 0.008817559108138084
Epoch 134/1500
  Batch 1/18, Loss: 0.006857226602733135
  Batch 11/18, Loss: 0.008834509178996086
Epoch 135/1500
  Batch 1/18, Loss: 0.01158105581998825
  Batch 11/18, Loss: 0.008974399417638779
Epoch 136/1500
  Batch 1/18, Loss: 0.010183501057326794
  Batch 11/18, Loss: 0.007668075151741505
Epoch 137/1500
  Batch 1/18, Loss: 0.0094751613214612
  Batch 11/18, Loss: 0.007855708710849285
Epoch 138/1500
  Batch 1/18, Loss: 0.009254863485693932
  Batch 11/18, Loss: 0.008147219195961952
Epoch 139/1500
  Batch 1/18, Loss: 0.008240493945777416
  Batch 11/18, Loss: 0.008677270263433456
Epoch 140/1500
  Batch 1/18, Loss: 0.00795577559620142
  Batch 11/18, Loss: 0.009723477996885777
Epoch 141/1500
  Batch 1/18, Loss: 0.009363860823214054
  Batch 11/18, Loss: 0.007870540954172611
Epoch 142/1500
  Batch 1/18, Loss: 0.007562301121652126
  Batch 11/18, Loss: 0.006120089907199144
Epoch 143/1500
  Batch 1/18, Loss: 0.008716191165149212
  Batch 11/18, Loss: 0.008148238994181156
Epoch 144/1500
```

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  Batch 1/18, Loss: 0.006821032147854567
  Batch 11/18, Loss: 0.00868980959057808
Epoch 145/1500
  Batch 1/18, Loss: 0.010798023082315922
  Batch 11/18, Loss: 0.0056725176982581615
Epoch 146/1500
  Batch 1/18, Loss: 0.007509940769523382
  Batch 11/18, Loss: 0.00726203853264451
Epoch 147/1500
  Batch 1/18, Loss: 0.008911577053368092
  Batch 11/18, Loss: 0.007866132073104382
Epoch 148/1500
  Batch 1/18, Loss: 0.008039620704948902
  Batch 11/18, Loss: 0.006184180732816458
Epoch 149/1500
  Batch 1/18, Loss: 0.008661567233502865
  Batch 11/18, Loss: 0.005483276676386595
Epoch 150/1500
  Batch 1/18, Loss: 0.008446458727121353
  Batch 11/18, Loss: 0.006850840989500284
Epoch 151/1500
  Batch 1/18, Loss: 0.00913327932357788
  Batch 11/18, Loss: 0.007715923711657524
After epoch 150, loss=0.0071191550232470036
Epoch 152/1500
  Batch 1/18, Loss: 0.008169169537723064
  Batch 11/18, Loss: 0.007051251363009214
Epoch 153/1500
  Batch 1/18, Loss: 0.0073197511956095695
  Batch 11/18, Loss: 0.008058629930019379
Epoch 154/1500
  Batch 1/18, Loss: 0.009141417220234871
  Batch 11/18, Loss: 0.006474134512245655
Epoch 155/1500
  Batch 1/18, Loss: 0.007300377823412418
  Batch 11/18, Loss: 0.004729736130684614
Epoch 156/1500
  Batch 1/18, Loss: 0.008158208802342415
  Batch 11/18, Loss: 0.004758807830512524
Epoch 157/1500
  Batch 1/18, Loss: 0.006397499702870846
  Batch 11/18, Loss: 0.00585567532107234
Epoch 158/1500
  Batch 1/18, Loss: 0.00460166297852993
  Batch 11/18, Loss: 0.005201433785259724
Epoch 159/1500
  Batch 1/18, Loss: 0.006143891718238592
  Batch 11/18, Loss: 0.006169231608510017
```

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Epoch 160/1500
  Batch 1/18, Loss: 0.004218133166432381
  Batch 11/18, Loss: 0.008774969726800919
Epoch 161/1500
  Batch 1/18, Loss: 0.011157157830893993
  Batch 11/18, Loss: 0.0066225966438651085
Epoch 162/1500
  Batch 1/18, Loss: 0.006134563125669956
  Batch 11/18, Loss: 0.005011905916035175
Epoch 163/1500
  Batch 1/18, Loss: 0.005209119990468025
  Batch 11/18, Loss: 0.007328060921281576
Epoch 164/1500
  Batch 1/18, Loss: 0.006190174259245396
  Batch 11/18, Loss: 0.006789737846702337
Epoch 165/1500
  Batch 1/18, Loss: 0.007275846321135759
  Batch 11/18, Loss: 0.005866451654583216
Epoch 166/1500
  Batch 1/18, Loss: 0.003925101365894079
  Batch 11/18, Loss: 0.0046523152850568295
Epoch 167/1500
  Batch 1/18, Loss: 0.005167204421013594
  Batch 11/18, Loss: 0.006385009735822678
Epoch 168/1500
  Batch 1/18, Loss: 0.008628672920167446
  Batch 11/18, Loss: 0.006187771447002888
Epoch 169/1500
  Batch 1/18, Loss: 0.004847072996199131
  Batch 11/18, Loss: 0.005218314938247204
Epoch 170/1500
  Batch 1/18, Loss: 0.004706583451479673
  Batch 11/18, Loss: 0.004970311652868986
Epoch 171/1500
  Batch 1/18, Loss: 0.004580544773489237
  Batch 11/18, Loss: 0.005468903109431267
Epoch 172/1500
  Batch 1/18, Loss: 0.002807619282975793
  Batch 11/18, Loss: 0.004611582960933447
Epoch 173/1500
  Batch 1/18, Loss: 0.005302994512021542
  Batch 11/18, Loss: 0.004187478683888912
Epoch 174/1500
  Batch 1/18, Loss: 0.006795880384743214
  Batch 11/18, Loss: 0.004945945926010609
Epoch 175/1500
  Batch 1/18, Loss: 0.0037385430186986923
  Batch 11/18, Loss: 0.006032210774719715
```

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Epoch 176/1500
  Batch 1/18, Loss: 0.0036923508159816265
  Batch 11/18, Loss: 0.0034554239828139544
Epoch 177/1500
  Batch 1/18, Loss: 0.004213876556605101
  Batch 11/18, Loss: 0.0030578451696783304
Epoch 178/1500
  Batch 1/18, Loss: 0.003971288446336985
  Batch 11/18, Loss: 0.003625888144597411
Epoch 179/1500
  Batch 1/18, Loss: 0.004131704103201628
  Batch 11/18, Loss: 0.005268700420856476
Epoch 180/1500
  Batch 1/18, Loss: 0.00230066548101604
  Batch 11/18, Loss: 0.005669958423823118
Epoch 181/1500
  Batch 1/18, Loss: 0.0034510998521000147
  Batch 11/18, Loss: 0.0032081608660519123
Epoch 182/1500
  Batch 1/18, Loss: 0.004217281471937895
  Batch 11/18, Loss: 0.0044597238302230835
Epoch 183/1500
  Batch 1/18, Loss: 0.004962775856256485
  Batch 11/18, Loss: 0.005376542452722788
Epoch 184/1500
  Batch 1/18, Loss: 0.0038851744029670954
  Batch 11/18, Loss: 0.0021433786023408175
Epoch 185/1500
  Batch 1/18, Loss: 0.002132992260158062
  Batch 11/18, Loss: 0.003961825277656317
Epoch 186/1500
  Batch 1/18, Loss: 0.00265623745508492
  Batch 11/18, Loss: 0.0025536164175719023
Epoch 187/1500
  Batch 1/18, Loss: 0.002852151170372963
  Batch 11/18, Loss: 0.004350751638412476
Epoch 188/1500
  Batch 1/18, Loss: 0.0023803021758794785
  Batch 11/18, Loss: 0.0020179750863462687
Epoch 189/1500
  Batch 1/18, Loss: 0.002567419782280922
  Batch 11/18, Loss: 0.003402336500585079
Epoch 190/1500
  Batch 1/18, Loss: 0.0033298139460384846
  Batch 11/18, Loss: 0.002305407542735338
Epoch 191/1500
  Batch 1/18, Loss: 0.0023977328091859818
  Batch 11/18, Loss: 0.0015547778457403183
```

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Epoch 192/1500
  Batch 1/18, Loss: 0.00285467435605824
  Batch 11/18, Loss: 0.002237729961052537
Epoch 193/1500
  Batch 1/18, Loss: 0.004062688909471035
  Batch 11/18, Loss: 0.001911335508339107
Epoch 194/1500
  Batch 1/18, Loss: 0.003253903007134795
  Batch 11/18, Loss: 0.0010424487991258502
Epoch 195/1500
  Batch 1/18, Loss: 0.004403546452522278
  Batch 11/18, Loss: 0.0015275697223842144
Epoch 196/1500
  Batch 1/18, Loss: 0.003739849431440234
  Batch 11/18, Loss: 0.001630978542380035
Epoch 197/1500
  Batch 1/18, Loss: 0.003124634735286236
  Batch 11/18, Loss: 0.0021893358789384365
Epoch 198/1500
  Batch 1/18, Loss: 0.0037010132800787687
  Batch 11/18, Loss: 0.0030350268352776766
Epoch 199/1500
  Batch 1/18, Loss: 0.003649415448307991
  Batch 11/18, Loss: 0.0027605195064097643
Epoch 200/1500
  Batch 1/18, Loss: 0.002962829079478979
  Batch 11/18, Loss: 0.0035187744069844484
Epoch 201/1500
  Batch 1/18, Loss: 0.0019491770071908832
  Batch 11/18, Loss: 0.0013782782480120659
After epoch 200, loss=0.0022767563350498676
Epoch 202/1500
  Batch 1/18, Loss: 0.0020684420596808195
  Batch 11/18, Loss: 0.0013816449791193008
Epoch 203/1500
  Batch 1/18, Loss: 0.0019008744275197387
  Batch 11/18, Loss: 0.001956603256985545
Epoch 204/1500
  Batch 1/18, Loss: 0.0031148134730756283
  Batch 11/18, Loss: 0.0020586259197443724
Epoch 205/1500
  Batch 1/18, Loss: 0.0016092099249362946
  Batch 11/18, Loss: 0.0017256720457226038
Epoch 206/1500
  Batch 1/18, Loss: 0.0018364745192229748
  Batch 11/18, Loss: 0.0012389181647449732
Epoch 207/1500
  Batch 1/18, Loss: 0.0031077128369361162
```

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  Batch 11/18, Loss: 0.0013771706726402044
Epoch 208/1500
  Batch 1/18, Loss: 0.0023471389431506395
  Batch 11/18, Loss: 0.002824988681823015
Epoch 209/1500
  Batch 1/18, Loss: 0.002537689171731472
  Batch 11/18, Loss: 0.0006240790244191885
Epoch 210/1500
  Batch 1/18, Loss: 0.0020264042541384697
  Batch 11/18, Loss: 0.0016706380993127823
Epoch 211/1500
  Batch 1/18, Loss: 0.00239162496291101
  Batch 11/18, Loss: 0.0023059675004333258
Epoch 212/1500
  Batch 1/18, Loss: 0.0005473801866173744
  Batch 11/18, Loss: 0.0034052301198244095
Epoch 213/1500
  Batch 1/18, Loss: 0.0025528189726173878
  Batch 11/18, Loss: 0.0022433416452258825
Epoch 214/1500
  Batch 1/18, Loss: 0.003018102841451764
  Batch 11/18, Loss: 0.0012890466023236513
Epoch 215/1500
  Batch 1/18, Loss: 0.001278018462471664
  Batch 11/18, Loss: 0.0011252722470089793
Epoch 216/1500
  Batch 1/18, Loss: 0.001384551404044032
  Batch 11/18, Loss: 0.0021345228888094425
Epoch 217/1500
  Batch 1/18, Loss: 0.0022494217846542597
  Batch 11/18, Loss: 0.0022588646970689297
Epoch 218/1500
  Batch 1/18, Loss: 0.002596033737063408
  Batch 11/18, Loss: 0.003101583570241928
Epoch 219/1500
  Batch 1/18, Loss: 0.0007501668878830969
  Batch 11/18, Loss: 0.0023266186472028494
Epoch 220/1500
  Batch 1/18, Loss: 0.001637439476326108
  Batch 11/18, Loss: 0.003517134115099907
Epoch 221/1500
  Batch 1/18, Loss: 0.003593506058678031
  Batch 11/18, Loss: 0.0015330702299252152
Epoch 222/1500
  Batch 1/18, Loss: 0.002356382552534342
  Batch 11/18, Loss: 0.0014823527308180928
Epoch 223/1500
  Batch 1/18, Loss: 0.001174772041849792
```

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  Batch 11/18, Loss: 0.0018312076572328806
Epoch 224/1500
  Batch 1/18, Loss: 0.0021179220639169216
  Batch 11/18, Loss: 0.001641634269617498
Epoch 225/1500
  Batch 1/18, Loss: 0.0026115907821804285
  Batch 11/18, Loss: 0.0025494161527603865
Epoch 226/1500
  Batch 1/18, Loss: 0.0016374487895518541
  Batch 11/18, Loss: 0.001380100380629301
Epoch 227/1500
  Batch 1/18, Loss: 0.0013527398696169257
  Batch 11/18, Loss: 0.0013395545538514853
Epoch 228/1500
  Batch 1/18, Loss: 0.0015529199736192822
  Batch 11/18, Loss: 0.0015446941833943129
Epoch 229/1500
  Batch 1/18, Loss: 0.0017013425240293145
  Batch 11/18, Loss: 0.0010080070933327079
Epoch 230/1500
  Batch 1/18, Loss: 0.0019960266072303057
  Batch 11/18, Loss: 0.002255941042676568
Epoch 231/1500
  Batch 1/18, Loss: 0.0020544962026178837
  Batch 11/18, Loss: 0.0029514366760849953
Epoch 232/1500
  Batch 1/18, Loss: 0.001961307367309928
  Batch 11/18, Loss: 0.0019096139585599303
Epoch 233/1500
  Batch 1/18, Loss: 0.0008531241328455508
  Batch 11/18, Loss: 0.001257183263078332
Epoch 234/1500
  Batch 1/18, Loss: 0.001150214928202331
  Batch 11/18, Loss: 0.0013833915581926703
Epoch 235/1500
  Batch 1/18, Loss: 0.001254664151929319
  Batch 11/18, Loss: 0.0017119674012064934
Epoch 236/1500
  Batch 1/18, Loss: 0.0009624020894989371
  Batch 11/18, Loss: 0.00039380526868626475
Epoch 237/1500
  Batch 1/18, Loss: 0.0012863688170909882
  Batch 11/18, Loss: 0.0020527075976133347
Epoch 238/1500
  Batch 1/18, Loss: 0.0020521972328424454
  Batch 11/18, Loss: 0.0013766404008492827
Epoch 239/1500
  Batch 1/18, Loss: 0.0012376868398860097
```

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  Batch 11/18, Loss: 0.0013397623552009463
Epoch 240/1500
  Batch 1/18, Loss: 0.001586265629157424
  Batch 11/18, Loss: 0.001942434231750667
Epoch 241/1500
  Batch 1/18, Loss: 0.0019084156956523657
  Batch 11/18, Loss: 0.0014305806253105402
Epoch 242/1500
  Batch 1/18, Loss: 0.0013198098167777061
  Batch 11/18, Loss: 0.0009558750316500664
Epoch 243/1500
  Batch 1/18, Loss: 0.002098949858918786
  Batch 11/18, Loss: 0.000594066921621561
Epoch 244/1500
  Batch 1/18, Loss: 0.00279631232842803
  Batch 11/18, Loss: 0.0017999097472056746
Epoch 245/1500
  Batch 1/18, Loss: 0.0008909252937883139
  Batch 11/18, Loss: 0.0008409156580455601
Epoch 246/1500
  Batch 1/18, Loss: 0.0017009145813062787
  Batch 11/18, Loss: 0.0012206792598590255
Epoch 247/1500
  Batch 1/18, Loss: 0.0007619049283675849
  Batch 11/18, Loss: 0.0008385024848394096
Epoch 248/1500
  Batch 1/18, Loss: 0.001208032132126391
  Batch 11/18, Loss: 0.0007453752914443612
Epoch 249/1500
  Batch 1/18, Loss: 0.0010459435870870948
  Batch 11/18, Loss: 0.0018316383939236403
Epoch 250/1500
  Batch 1/18, Loss: 0.001449836534447968
  Batch 11/18, Loss: 0.00132216967176646
Epoch 251/1500
  Batch 1/18, Loss: 0.002188336569815874
  Batch 11/18, Loss: 0.002270204946398735
After epoch 250, loss=0.0009674746543169022
Epoch 252/1500
  Batch 1/18, Loss: 0.0018471345538273454
  Batch 11/18, Loss: 0.0014351222198456526
Epoch 253/1500
  Batch 1/18, Loss: 0.0010544226970523596
  Batch 11/18, Loss: 0.00148398510646075
Epoch 254/1500
  Batch 1/18, Loss: 0.0009101980831474066
  Batch 11/18, Loss: 0.001637845765799284
Epoch 255/1500
```

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  Batch 1/18, Loss: 0.0005188715877011418
  Batch 11/18, Loss: 0.0017452917527407408
Epoch 256/1500
  Batch 1/18, Loss: 0.0011497611412778497
  Batch 11/18, Loss: 0.0017734126886352897
Epoch 257/1500
  Batch 1/18, Loss: 0.0018533150432631373
  Batch 11/18, Loss: 0.0011213883990421891
Epoch 258/1500
  Batch 1/18, Loss: 0.0005158482817932963
  Batch 11/18, Loss: 0.0014639649307355285
Epoch 259/1500
  Batch 1/18, Loss: 0.0022766455076634884
  Batch 11/18, Loss: 0.0011677008587867022
Epoch 260/1500
  Batch 1/18, Loss: 0.0014642984606325626
  Batch 11/18, Loss: 0.0014588639605790377
Epoch 261/1500
  Batch 1/18, Loss: 0.0006045085610821843
  Batch 11/18, Loss: 0.0011689201928675175
Epoch 262/1500
  Batch 1/18, Loss: 0.0007418172899633646
  Batch 11/18, Loss: 0.000682986166793853
Epoch 263/1500
  Batch 1/18, Loss: 0.0012569907121360302
  Batch 11/18, Loss: 0.0008681358303874731
Epoch 264/1500
  Batch 1/18, Loss: 0.001735569559969008
  Batch 11/18, Loss: 0.0007067632395774126
Epoch 265/1500
  Batch 1/18, Loss: 0.0008867406868375838
  Batch 11/18, Loss: 0.0012294789776206017
Epoch 266/1500
  Batch 1/18, Loss: 0.000827830983325839
  Batch 11/18, Loss: 0.0005978394183330238
Epoch 267/1500
  Batch 1/18, Loss: 0.001555255614221096
  Batch 11/18, Loss: 0.0009286977583542466
Epoch 268/1500
  Batch 1/18, Loss: 0.0013633344788104296
  Batch 11/18, Loss: 0.0009939176961779594
Epoch 269/1500
  Batch 1/18, Loss: 0.0013732241932302713
  Batch 11/18, Loss: 0.0025479730684310198
Epoch 270/1500
  Batch 1/18, Loss: 0.00045995909022167325
  Batch 11/18, Loss: 0.0010805382626131177
Epoch 271/1500
```

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  Batch 1/18, Loss: 0.0011636415729299188
  Batch 11/18, Loss: 0.0012552565895020962
Epoch 272/1500
  Batch 1/18, Loss: 0.00216554943472147
  Batch 11/18, Loss: 0.0006274916231632233
Epoch 273/1500
  Batch 1/18, Loss: 0.0007029414991848171
  Batch 11/18, Loss: 0.001464520813897252
Epoch 274/1500
  Batch 1/18, Loss: 0.0018383088754490018
  Batch 11/18, Loss: 0.0010495748138055205
Epoch 275/1500
  Batch 1/18, Loss: 0.002488295314833522
  Batch 11/18, Loss: 0.0010373737895861268
Epoch 276/1500
  Batch 1/18, Loss: 0.0008525488083250821
  Batch 11/18, Loss: 0.0017738252645358443
Epoch 277/1500
  Batch 1/18, Loss: 0.0012692105956375599
  Batch 11/18, Loss: 0.0006303747650235891
Epoch 278/1500
  Batch 1/18, Loss: 0.0014199860161170363
  Batch 11/18, Loss: 0.00032717996509745717
Epoch 279/1500
  Batch 1/18, Loss: 0.0010650489712134004
  Batch 11/18, Loss: 0.0008471489418298006
Epoch 280/1500
  Batch 1/18, Loss: 0.0010273053776472807
  Batch 11/18, Loss: 0.0013741978909820318
Epoch 281/1500
  Batch 1/18, Loss: 0.0018419860862195492
  Batch 11/18, Loss: 0.000985155813395977
Epoch 282/1500
  Batch 1/18, Loss: 0.0016984104877337813
  Batch 11/18, Loss: 0.0005303824436850846
Epoch 283/1500
  Batch 1/18, Loss: 0.0006118240999057889
  Batch 11/18, Loss: 0.0012154298601672053
Epoch 284/1500
  Batch 1/18, Loss: 0.0010500266216695309
  Batch 11/18, Loss: 0.0008100091945379972
Epoch 285/1500
  Batch 1/18, Loss: 0.0015452969819307327
  Batch 11/18, Loss: 0.0012999356258660555
Epoch 286/1500
  Batch 1/18, Loss: 0.000393837399315089
  Batch 11/18, Loss: 0.0012754397466778755
Epoch 287/1500
```

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  Batch 1/18, Loss: 0.0010685970773920417
  Batch 11/18, Loss: 0.00037343284930102527
Epoch 288/1500
  Batch 1/18, Loss: 0.0008270731195807457
  Batch 11/18, Loss: 0.0006454571266658604
Epoch 289/1500
  Batch 1/18, Loss: 0.0008100744453258812
  Batch 11/18, Loss: 0.0011139035923406482
Epoch 290/1500
  Batch 1/18, Loss: 0.0007466348470188677
  Batch 11/18, Loss: 0.0012480011209845543
Epoch 291/1500
  Batch 1/18, Loss: 0.0017165730241686106
  Batch 11/18, Loss: 0.0008105027372948825
Epoch 292/1500
  Batch 1/18, Loss: 0.0006880280561745167
  Batch 11/18, Loss: 0.0007900952477939427
Epoch 293/1500
  Batch 1/18, Loss: 0.0003572640416678041
  Batch 11/18, Loss: 0.0010298117995262146
Epoch 294/1500
  Batch 1/18, Loss: 0.0012500393204391003
  Batch 11/18, Loss: 0.00038508319994434714
Epoch 295/1500
  Batch 1/18, Loss: 0.0009953930275514722
  Batch 11/18, Loss: 0.00034324932494200766
Epoch 296/1500
  Batch 1/18, Loss: 0.0005981640424579382
  Batch 11/18, Loss: 0.000682520680129528
Epoch 297/1500
  Batch 1/18, Loss: 0.0025360239669680595
  Batch 11/18, Loss: 0.0007460919441655278
Epoch 298/1500
  Batch 1/18, Loss: 0.0006158177275210619
  Batch 11/18, Loss: 0.0013340986333787441
Epoch 299/1500
  Batch 1/18, Loss: 0.00048769815475679934
  Batch 11/18, Loss: 0.0009062919998541474
Epoch 300/1500
  Batch 1/18, Loss: 0.0008194692782126367
  Batch 11/18, Loss: 0.0014815300237387419
Epoch 301/1500
  Batch 1/18, Loss: 0.0010218097595497966
  Batch 11/18, Loss: 0.0005419407971203327
After epoch 300, loss=0.0004234219959471375
Epoch 302/1500
  Batch 1/18, Loss: 0.0012684538960456848
  Batch 11/18, Loss: 0.002213456202298403
```

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Epoch 303/1500
  Batch 1/18, Loss: 0.000319790473440662
  Batch 11/18, Loss: 0.0007452636491507292
Epoch 304/1500
  Batch 1/18, Loss: 0.0008972086361609399
  Batch 11/18, Loss: 0.0004979202058166265
Epoch 305/1500
  Batch 1/18, Loss: 0.0012154816649854183
  Batch 11/18, Loss: 0.0008302032947540283
Epoch 306/1500
  Batch 1/18, Loss: 0.0004946906701661646
  Batch 11/18, Loss: 0.0007454255828633904
Epoch 307/1500
  Batch 1/18, Loss: 0.0006352457567118108
  Batch 11/18, Loss: 0.0010394116397947073
Epoch 308/1500
  Batch 1/18, Loss: 0.0005476187216117978
  Batch 11/18, Loss: 0.0008049474563449621
Epoch 309/1500
  Batch 1/18, Loss: 0.00025619848747737706
  Batch 11/18, Loss: 0.0008826901321299374
Epoch 310/1500
  Batch 1/18, Loss: 0.0004112142196390778
  Batch 11/18, Loss: 0.0013274969533085823
Epoch 311/1500
  Batch 1/18, Loss: 0.0008429280132986605
  Batch 11/18, Loss: 0.0004251256468705833
Epoch 312/1500
  Batch 1/18, Loss: 0.00039294143789447844
  Batch 11/18, Loss: 0.0007241755956783891
Epoch 313/1500
  Batch 1/18, Loss: 0.00035229252534918487
  Batch 11/18, Loss: 0.0008343763183802366
Epoch 314/1500
  Batch 1/18, Loss: 0.00043804701999761164
  Batch 11/18, Loss: 0.0003284203412476927
Epoch 315/1500
  Batch 1/18, Loss: 0.0017367546679452062
  Batch 11/18, Loss: 0.0002585599140729755
Epoch 316/1500
  Batch 1/18, Loss: 0.0004402822523843497
  Batch 11/18, Loss: 0.0016308320919051766
Epoch 317/1500
  Batch 1/18, Loss: 0.00033164338674396276
  Batch 11/18, Loss: 0.0011452704202383757
Epoch 318/1500
  Batch 1/18, Loss: 0.00038538913941010833
  Batch 11/18, Loss: 0.00151927606202662
```

```
Epoch 319/1500
  Batch 1/18, Loss: 0.0004743431636597961
  Batch 11/18, Loss: 0.0006521424511447549
Epoch 320/1500
  Batch 1/18, Loss: 0.0005069294129498303
  Batch 11/18, Loss: 0.0005635275738313794
Epoch 321/1500
  Batch 1/18, Loss: 0.0005733318394050002
  Batch 11/18, Loss: 0.0006693647592328489
Epoch 322/1500
  Batch 1/18, Loss: 0.0008107447065412998
  Batch 11/18, Loss: 0.0004821394686587155
Epoch 323/1500
  Batch 1/18, Loss: 0.00075423379894346
  Batch 11/18, Loss: 0.00032648674095980823
Epoch 324/1500
  Batch 1/18, Loss: 0.000658819277305156
  Batch 11/18, Loss: 0.0004962835228070617
Epoch 325/1500
  Batch 1/18, Loss: 0.0017014002660289407
  Batch 11/18, Loss: 0.000516472093295306
Epoch 326/1500
  Batch 1/18, Loss: 0.0005254211137071252
  Batch 11/18, Loss: 0.0006152480491437018
Epoch 327/1500
  Batch 1/18, Loss: 0.0006795783410780132
  Batch 11/18, Loss: 0.0006693894392810762
Epoch 328/1500
  Batch 1/18, Loss: 0.0010228611063212156
  Batch 11/18, Loss: 0.0005157291307114065
Epoch 329/1500
  Batch 1/18, Loss: 0.0007494378951378167
  Batch 11/18, Loss: 0.0004420700715854764
Epoch 330/1500
  Batch 1/18, Loss: 0.0002427026629447937
  Batch 11/18, Loss: 0.0018737419741228223
Epoch 331/1500
  Batch 1/18, Loss: 0.0011784546077251434
  Batch 11/18, Loss: 0.00041448866249993443
Epoch 332/1500
  Batch 1/18, Loss: 0.0005183835746720433
  Batch 11/18, Loss: 0.0003501193132251501
Epoch 333/1500
  Batch 1/18, Loss: 0.0006031322991475463
  Batch 11/18, Loss: 0.0006119809113442898
Epoch 334/1500
  Batch 1/18, Loss: 0.0005173676763661206
  Batch 11/18, Loss: 0.00066681660246104
```

```
Epoch 335/1500
  Batch 1/18, Loss: 0.0006677086348645389
  Batch 11/18, Loss: 0.0005106112221255898
Epoch 336/1500
  Batch 1/18, Loss: 0.00031994516029953957
  Batch 11/18, Loss: 0.00045589805813506246
Epoch 337/1500
  Batch 1/18, Loss: 0.0002252491976832971
  Batch 11/18, Loss: 0.0005704436334781349
Epoch 338/1500
  Batch 1/18, Loss: 0.0005506830057129264
  Batch 11/18, Loss: 0.0005219872109591961
Epoch 339/1500
  Batch 1/18, Loss: 0.0006408084882423282
  Batch 11/18, Loss: 0.0006023404421284795
Epoch 340/1500
  Batch 1/18, Loss: 0.0010163590777665377
  Batch 11/18, Loss: 0.0007438958855345845
Epoch 341/1500
  Batch 1/18, Loss: 0.0010269280755892396
  Batch 11/18, Loss: 0.00047609166358597577
Epoch 342/1500
  Batch 1/18, Loss: 0.0008089885232038796
  Batch 11/18, Loss: 0.00045903329737484455
Epoch 343/1500
  Batch 1/18, Loss: 0.00034704775316640735
  Batch 11/18, Loss: 0.00026813760632649064
Epoch 344/1500
  Batch 1/18, Loss: 0.00032925058621913195
  Batch 11/18, Loss: 0.0018263398669660091
Epoch 345/1500
  Batch 1/18, Loss: 0.0003871858643833548
  Batch 11/18, Loss: 0.0003750046598725021
Epoch 346/1500
  Batch 1/18, Loss: 0.0008735861629247665
  Batch 11/18, Loss: 0.000551938486751169
Epoch 347/1500
  Batch 1/18, Loss: 0.0005337371258065104
  Batch 11/18, Loss: 0.0003136344894301146
Epoch 348/1500
  Batch 1/18, Loss: 0.0005846774438396096
  Batch 11/18, Loss: 0.0006866598851047456
Epoch 349/1500
  Batch 1/18, Loss: 0.0004023116489406675
  Batch 11/18, Loss: 0.00029656520928256214
Epoch 350/1500
  Batch 1/18, Loss: 0.00018897352856583893
  Batch 11/18, Loss: 0.00019781608716584742
```

```
Epoch 351/1500
  Batch 1/18, Loss: 0.0017252694815397263
  Batch 11/18, Loss: 0.0003462546446826309
After epoch 350, loss=0.00041625151061452925
Epoch 352/1500
  Batch 1/18, Loss: 0.00037093841820023954
  Batch 11/18, Loss: 0.0003681023372337222
Epoch 353/1500
  Batch 1/18, Loss: 0.00032698491122573614
  Batch 11/18, Loss: 0.00044264300959184766
Epoch 354/1500
  Batch 1/18, Loss: 0.0009353890782222152
  Batch 11/18, Loss: 0.00037282638368196785
Epoch 355/1500
  Batch 1/18, Loss: 0.0018346774158999324
  Batch 11/18, Loss: 0.00048572360537946224
Epoch 356/1500
  Batch 1/18, Loss: 0.00048199467710219324
  Batch 11/18, Loss: 0.000670341367367655
Epoch 357/1500
  Batch 1/18, Loss: 0.00076920964056662596
  Batch 11/18, Loss: 0.0006710841553285718
Epoch 358/1500
  Batch 1/18, Loss: 0.00048479385441169143
  Batch 11/18, Loss: 0.000418729119701311
Epoch 359/1500
  Batch 1/18, Loss: 0.0009111639810726047
  Batch 11/18, Loss: 0.0016471680719405413
Epoch 360/1500
  Batch 1/18, Loss: 0.0006224794196896255
  Batch 11/18, Loss: 0.00040755775989964604
Epoch 361/1500
  Batch 1/18, Loss: 0.00203517684713006
  Batch 11/18, Loss: 0.0006938466103747487
Epoch 362/1500
  Batch 1/18, Loss: 0.00047053874004632235
  Batch 11/18, Loss: 0.0004118054057471454
Epoch 363/1500
  Batch 1/18, Loss: 0.000445294426754117
  Batch 11/18, Loss: 0.0005990765057504177
Epoch 364/1500
  Batch 1/18, Loss: 0.0006715689087286592
  Batch 11/18, Loss: 0.0016507497057318687
Epoch 365/1500
  Batch 1/18, Loss: 0.0017105246661230922
  Batch 11/18, Loss: 0.000431068387153742
Epoch 366/1500
  Batch 1/18, Loss: 0.0005875201895833015
```

```
  Batch 11/18, Loss: 0.0003015952534042299
Epoch 367/1500
  Batch 1/18, Loss: 0.0005612898385152221
  Batch 11/18, Loss: 0.0004064053646288812
Epoch 368/1500
  Batch 1/18, Loss: 0.00032949761953204487
  Batch 11/18, Loss: 0.0004980377270840108
Epoch 369/1500
  Batch 1/18, Loss: 0.0004797990550287068
  Batch 11/18, Loss: 0.0003160673368256539
Epoch 370/1500
  Batch 1/18, Loss: 0.0002636568096932024
  Batch 11/18, Loss: 0.0006865208270028234
Epoch 371/1500
  Batch 1/18, Loss: 0.00025928145623765886
  Batch 11/18, Loss: 0.0006150700501166284
Epoch 372/1500
  Batch 1/18, Loss: 0.0007874590810388327
  Batch 11/18, Loss: 0.0006217871559783816
Epoch 373/1500
  Batch 1/18, Loss: 0.000708509876858443
  Batch 11/18, Loss: 0.0004156055219937116
Epoch 374/1500
  Batch 1/18, Loss: 0.00047034703311510384
  Batch 11/18, Loss: 0.000836564286146313
Epoch 375/1500
  Batch 1/18, Loss: 0.0005456760991364717
  Batch 11/18, Loss: 0.0006517778965644538
Epoch 376/1500
  Batch 1/18, Loss: 0.00031895271968096495
  Batch 11/18, Loss: 0.0004077693447470665
Epoch 377/1500
  Batch 1/18, Loss: 0.00029263735632412136
  Batch 11/18, Loss: 0.0004217802488710731
Epoch 378/1500
  Batch 1/18, Loss: 0.0005208651418797672
  Batch 11/18, Loss: 0.0005691289552487433
Epoch 379/1500
  Batch 1/18, Loss: 0.000610917981248349
  Batch 11/18, Loss: 0.0005881263059563935
Epoch 380/1500
  Batch 1/18, Loss: 0.0003219599893782288
  Batch 11/18, Loss: 0.0005158457206562161
Epoch 381/1500
  Batch 1/18, Loss: 0.00033325637923553586
  Batch 11/18, Loss: 0.00023346097441390157
Epoch 382/1500
  Batch 1/18, Loss: 0.0005973652005195618
```

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  Batch 11/18, Loss: 0.000552019861061126
Epoch 383/1500
  Batch 1/18, Loss: 0.0004158700176049024
  Batch 11/18, Loss: 0.0004548528522718698
Epoch 384/1500
  Batch 1/18, Loss: 0.0003310602915007621
  Batch 11/18, Loss: 0.0002718046889640391
Epoch 385/1500
  Batch 1/18, Loss: 0.0005538403638638556
  Batch 11/18, Loss: 0.0006985660293139517
Epoch 386/1500
  Batch 1/18, Loss: 0.0003135752340313047
  Batch 11/18, Loss: 0.0005619635921902955
Epoch 387/1500
  Batch 1/18, Loss: 0.0004879030166193843
  Batch 11/18, Loss: 0.0003571475681383163
Epoch 388/1500
  Batch 1/18, Loss: 0.0005550068453885615
  Batch 11/18, Loss: 0.00040662201354280114
Epoch 389/1500
  Batch 1/18, Loss: 0.0006593241705559194
  Batch 11/18, Loss: 0.0003275729832239449
Epoch 390/1500
  Batch 1/18, Loss: 0.0003525812644511461
  Batch 11/18, Loss: 0.0002755259338300675
Epoch 391/1500
  Batch 1/18, Loss: 0.00046934455167502165
  Batch 11/18, Loss: 0.0005074475193396211
Epoch 392/1500
  Batch 1/18, Loss: 0.00040702809928916395
  Batch 11/18, Loss: 0.0008301864145323634
Epoch 393/1500
  Batch 1/18, Loss: 0.0003762145643122494
  Batch 11/18, Loss: 0.0005029296153225005
Epoch 394/1500
  Batch 1/18, Loss: 0.0005133839440532029
  Batch 11/18, Loss: 0.00035307815414853394
Epoch 395/1500
  Batch 1/18, Loss: 0.00033459297264926136
  Batch 11/18, Loss: 0.001773093594238162
Epoch 396/1500
  Batch 1/18, Loss: 0.0008268996607512236
  Batch 11/18, Loss: 0.00030037524993531406
Epoch 397/1500
  Batch 1/18, Loss: 0.00022149001597426832
  Batch 11/18, Loss: 0.001596668385900557
Epoch 398/1500
  Batch 1/18, Loss: 0.001615001237951219
```

```
  Batch 11/18, Loss: 0.00021331568132154644
Epoch 399/1500
  Batch 1/18, Loss: 0.00036975351395085454
  Batch 11/18, Loss: 0.0015160695184022188
Epoch 400/1500
  Batch 1/18, Loss: 0.000240606430452317
  Batch 11/18, Loss: 0.0003874171816278249
Epoch 401/1500
  Batch 1/18, Loss: 0.0008728007669560611
  Batch 11/18, Loss: 0.0003089242964051664
After epoch 400, loss=0.0002914778597187251
Epoch 402/1500
  Batch 1/18, Loss: 0.0004315788683015853
  Batch 11/18, Loss: 0.0006567274685949087
Epoch 403/1500
  Batch 1/18, Loss: 0.0003260560624767095
  Batch 11/18, Loss: 0.00029960068059153855
Epoch 404/1500
  Batch 1/18, Loss: 0.00027028925251215696
  Batch 11/18, Loss: 0.0003645365359261632
Epoch 405/1500
  Batch 1/18, Loss: 0.0008982319268397987
  Batch 11/18, Loss: 0.0004095594631507993
Epoch 406/1500
  Batch 1/18, Loss: 0.0003518272715155035
  Batch 11/18, Loss: 0.0003764245775528252
Epoch 407/1500
  Batch 1/18, Loss: 0.00034847139613702893
  Batch 11/18, Loss: 0.0003403322480153292
Epoch 408/1500
  Batch 1/18, Loss: 0.0003150214906781912
  Batch 11/18, Loss: 0.0007745029870420694
Epoch 409/1500
  Batch 1/18, Loss: 0.00032375764567404985
  Batch 11/18, Loss: 0.0004210409533698112
Epoch 410/1500
  Batch 1/18, Loss: 0.00045081385178491473
  Batch 11/18, Loss: 0.00034173415042459965
Epoch 411/1500
  Batch 1/18, Loss: 0.00037110247649252415
  Batch 11/18, Loss: 0.00027999046142213047
Epoch 412/1500
  Batch 1/18, Loss: 0.0003891660016961396
  Batch 11/18, Loss: 0.00041774759301915765
Epoch 413/1500
  Batch 1/18, Loss: 0.0008369794231839478
  Batch 11/18, Loss: 0.00024645455414429307
Epoch 414/1500
```

```
  Batch 1/18, Loss: 0.0007040532655082643
  Batch 11/18, Loss: 0.00033532921224832535
Epoch 415/1500
  Batch 1/18, Loss: 0.0003032411041203886
  Batch 11/18, Loss: 0.000372700160369277
Epoch 416/1500
  Batch 1/18, Loss: 0.0004445309459697455
  Batch 11/18, Loss: 0.0015562489861622453
Epoch 417/1500
  Batch 1/18, Loss: 0.0002845197741407901
  Batch 11/18, Loss: 0.0004333972465246916
Epoch 418/1500
  Batch 1/18, Loss: 0.000227280383114703
  Batch 11/18, Loss: 0.00022824497136753052
Epoch 419/1500
  Batch 1/18, Loss: 0.00025817687856033444
  Batch 11/18, Loss: 0.0005468010203912854
Epoch 420/1500
  Batch 1/18, Loss: 0.00032435572938993573
  Batch 11/18, Loss: 0.0003596917085815221
Epoch 421/1500
  Batch 1/18, Loss: 0.00031191069865599275
  Batch 11/18, Loss: 0.0004840371257159859
Epoch 422/1500
  Batch 1/18, Loss: 0.00036073580849915743
  Batch 11/18, Loss: 0.000527645053807646
Epoch 423/1500
  Batch 1/18, Loss: 0.0004921054351143539
  Batch 11/18, Loss: 0.0003239612269680947
Epoch 424/1500
  Batch 1/18, Loss: 0.00040250751771964133
  Batch 11/18, Loss: 0.0004371162212919444
Epoch 425/1500
  Batch 1/18, Loss: 0.0003029580693691969
  Batch 11/18, Loss: 0.0004470994172152132
Epoch 426/1500
  Batch 1/18, Loss: 0.00037211866583675146
  Batch 11/18, Loss: 0.0014911547768861055
Epoch 427/1500
  Batch 1/18, Loss: 0.0006284145638346672
  Batch 11/18, Loss: 0.00030947316554374993
Epoch 428/1500
  Batch 1/18, Loss: 0.00027184130158275366
  Batch 11/18, Loss: 0.000461776799056679
Epoch 429/1500
  Batch 1/18, Loss: 0.00035965139977633953
  Batch 11/18, Loss: 0.00033467792673036456
Epoch 430/1500
```

```
  Batch 1/18, Loss: 0.0005270560504868627
  Batch 11/18, Loss: 0.0002795820473693311
Epoch 431/1500
  Batch 1/18, Loss: 0.0002625234192237258
  Batch 11/18, Loss: 0.0004488436970859766
Epoch 432/1500
  Batch 1/18, Loss: 0.0002763742522802204
  Batch 11/18, Loss: 0.0015649407869204879
Epoch 433/1500
  Batch 1/18, Loss: 0.0015043258899822831
  Batch 11/18, Loss: 0.00046054323320277035
Epoch 434/1500
  Batch 1/18, Loss: 0.0003867181367240846
  Batch 11/18, Loss: 0.00025666423607617617
Epoch 435/1500
  Batch 1/18, Loss: 0.000271760334726423
  Batch 11/18, Loss: 0.0004832317354157567
Epoch 436/1500
  Batch 1/18, Loss: 0.00041052495362237096
  Batch 11/18, Loss: 0.00020071225299034268
Epoch 437/1500
  Batch 1/18, Loss: 0.00016438296006526798
  Batch 11/18, Loss: 0.00172348169144243
Epoch 438/1500
  Batch 1/18, Loss: 0.000272423931164667
  Batch 11/18, Loss: 0.0005518537946045399
Epoch 439/1500
  Batch 1/18, Loss: 0.0002607352798804641
  Batch 11/18, Loss: 0.00025484050274826586
Epoch 440/1500
  Batch 1/18, Loss: 0.0003965732466895133
  Batch 11/18, Loss: 0.00033534332760609686
Epoch 441/1500
  Batch 1/18, Loss: 0.000314569566398859
  Batch 11/18, Loss: 0.0008066907757893205
Epoch 442/1500
  Batch 1/18, Loss: 0.0005295677692629397
  Batch 11/18, Loss: 0.0002721386554185301
Epoch 443/1500
  Batch 1/18, Loss: 0.0003231935843359679
  Batch 11/18, Loss: 0.000505293719470501
Epoch 444/1500
  Batch 1/18, Loss: 0.00031025809585116804
  Batch 11/18, Loss: 0.0003131527337245643
Epoch 445/1500
  Batch 1/18, Loss: 0.00023715059796813875
  Batch 11/18, Loss: 0.00024009120534174144
Epoch 446/1500
```

```
  Batch 1/18, Loss: 0.0003553931601345539
  Batch 11/18, Loss: 0.0002657040022313595
Epoch 447/1500
  Batch 1/18, Loss: 0.000253732199780643
  Batch 11/18, Loss: 0.00025706016458570957
Epoch 448/1500
  Batch 1/18, Loss: 0.00030733912717550993
  Batch 11/18, Loss: 0.00033927950426004827
Epoch 449/1500
  Batch 1/18, Loss: 0.00025911381817422807
  Batch 11/18, Loss: 0.0003898208378814161
Epoch 450/1500
  Batch 1/18, Loss: 0.00027200145996175706
  Batch 11/18, Loss: 0.0002992429945152253
Epoch 451/1500
  Batch 1/18, Loss: 0.0004161497054155916
  Batch 11/18, Loss: 0.0005742011126130819
After epoch 450, loss=9.476245759287849e-05
Epoch 452/1500
  Batch 1/18, Loss: 0.00031723230495117605
  Batch 11/18, Loss: 0.00023864970717113465
Epoch 453/1500
  Batch 1/18, Loss: 0.00022450805408880115
  Batch 11/18, Loss: 0.00040591013384982944
Epoch 454/1500
  Batch 1/18, Loss: 0.00024648409453220665
  Batch 11/18, Loss: 0.0002593930112197995
Epoch 455/1500
  Batch 1/18, Loss: 0.00025039204047061503
  Batch 11/18, Loss: 0.0003063916228711605
Epoch 456/1500
  Batch 1/18, Loss: 0.0014217572752386332
  Batch 11/18, Loss: 0.000348647270584479
Epoch 457/1500
  Batch 1/18, Loss: 0.00021215816377662122
  Batch 11/18, Loss: 0.000777594861574471
Epoch 458/1500
  Batch 1/18, Loss: 0.0004981582751497626
  Batch 11/18, Loss: 0.0004027942195534706
Epoch 459/1500
  Batch 1/18, Loss: 0.00040000193985179067
  Batch 11/18, Loss: 0.0003661215305328369
Epoch 460/1500
  Batch 1/18, Loss: 0.0015330392634496093
  Batch 11/18, Loss: 0.0003678900538943708
Epoch 461/1500
  Batch 1/18, Loss: 0.0007817789446562529
  Batch 11/18, Loss: 0.0001694810634944588
```

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Epoch 462/1500
  Batch 1/18, Loss: 0.0003813464427366853
  Batch 11/18, Loss: 0.0003649815625976771
Epoch 463/1500
  Batch 1/18, Loss: 0.00017502332048024982
  Batch 11/18, Loss: 0.00028114873566664755
Epoch 464/1500
  Batch 1/18, Loss: 0.0013882480561733246
  Batch 11/18, Loss: 0.00041345611680299044
Epoch 465/1500
  Batch 1/18, Loss: 0.00037290752516128123
  Batch 11/18, Loss: 0.00030923826852813363
Epoch 466/1500
  Batch 1/18, Loss: 0.00047313072718679905
  Batch 11/18, Loss: 0.0003126559604424983
Epoch 467/1500
  Batch 1/18, Loss: 0.00027156926807947457
  Batch 11/18, Loss: 0.00026362709468230605
Epoch 468/1500
  Batch 1/18, Loss: 0.00032349242246709764
  Batch 11/18, Loss: 0.0003279669035691768
Epoch 469/1500
  Batch 1/18, Loss: 0.0002661292674019933
  Batch 11/18, Loss: 0.00020718439191114157
Epoch 470/1500
  Batch 1/18, Loss: 0.00027192692505195737
  Batch 11/18, Loss: 0.0003705616982188076
Epoch 471/1500
  Batch 1/18, Loss: 0.00028674141503870487
  Batch 11/18, Loss: 0.001483806176111102
Epoch 472/1500
  Batch 1/18, Loss: 0.0002898277307394892
  Batch 11/18, Loss: 0.0017248300136998296
Epoch 473/1500
  Batch 1/18, Loss: 0.0003107162774540484
  Batch 11/18, Loss: 0.0003947154327761382
Epoch 474/1500
  Batch 1/18, Loss: 0.000242944952333346
  Batch 11/18, Loss: 0.00028257755911909044
Epoch 475/1500
  Batch 1/18, Loss: 0.0003086258075200021
  Batch 11/18, Loss: 0.00024699856294319034
Epoch 476/1500
  Batch 1/18, Loss: 0.0003060807357542217
  Batch 11/18, Loss: 0.0002388875582255423
Epoch 477/1500
  Batch 1/18, Loss: 0.00022113780141808093
  Batch 11/18, Loss: 0.00037653150502592325
```

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Epoch 478/1500
  Batch 1/18, Loss: 0.0006014034734107554
  Batch 11/18, Loss: 0.0002905125729739666
Epoch 479/1500
  Batch 1/18, Loss: 0.0002867147559300065
  Batch 11/18, Loss: 0.00023974290525075048
Epoch 480/1500
  Batch 1/18, Loss: 0.0006072800606489182
  Batch 11/18, Loss: 0.00034744245931506157
Epoch 481/1500
  Batch 1/18, Loss: 0.00024166925868485123
  Batch 11/18, Loss: 0.0003112017293460667
Epoch 482/1500
  Batch 1/18, Loss: 0.00020055478671565652
  Batch 11/18, Loss: 0.0003074388951063156
Epoch 483/1500
  Batch 1/18, Loss: 0.0002460031828377396
  Batch 11/18, Loss: 0.0003835131647065282
Epoch 484/1500
  Batch 1/18, Loss: 0.0014812275767326355
  Batch 11/18, Loss: 0.000327074812958017
Epoch 485/1500
  Batch 1/18, Loss: 0.0003529516397975385
  Batch 11/18, Loss: 0.00028496328741312027
Epoch 486/1500
  Batch 1/18, Loss: 0.00020505004795268178
  Batch 11/18, Loss: 0.0003830680507235229
Epoch 487/1500
  Batch 1/18, Loss: 0.0003410952049307525
  Batch 11/18, Loss: 0.0018477472476661205
Epoch 488/1500
  Batch 1/18, Loss: 0.00018608379468787462
  Batch 11/18, Loss: 0.0005210281233303249
Epoch 489/1500
  Batch 1/18, Loss: 0.00027314055478200316
  Batch 11/18, Loss: 0.00024872124777175486
Epoch 490/1500
  Batch 1/18, Loss: 0.00016081238572951406
  Batch 11/18, Loss: 0.00024348226725123823
Epoch 491/1500
  Batch 1/18, Loss: 0.0003129447577521205
  Batch 11/18, Loss: 0.0005176145350560546
Epoch 492/1500
  Batch 1/18, Loss: 0.00023930775932967663
  Batch 11/18, Loss: 0.00035444306558929384
Epoch 493/1500
  Batch 1/18, Loss: 0.0005078929825685918
  Batch 11/18, Loss: 0.00030469472403638065
```

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Epoch 494/1500
  Batch 1/18, Loss: 0.0002467561571393162
  Batch 11/18, Loss: 0.000162218464538455
Epoch 495/1500
  Batch 1/18, Loss: 0.0002666125656105578
  Batch 11/18, Loss: 0.00030429946491494775
Epoch 496/1500
  Batch 1/18, Loss: 0.00037083958159200847
  Batch 11/18, Loss: 0.0002705753722693771
Epoch 497/1500
  Batch 1/18, Loss: 0.00034525978844612837
  Batch 11/18, Loss: 0.00013472922728396952
Epoch 498/1500
  Batch 1/18, Loss: 0.00027197468443773687
  Batch 11/18, Loss: 0.00027890337514691055
Epoch 499/1500
  Batch 1/18, Loss: 0.00038192066131159663
  Batch 11/18, Loss: 0.0001686922914814204
Epoch 500/1500
  Batch 1/18, Loss: 0.00029410995193757117
  Batch 11/18, Loss: 0.00032132939668372273
Epoch 501/1500
  Batch 1/18, Loss: 0.0003545977524481714
  Batch 11/18, Loss: 0.00024552689865231514
After epoch 500, loss=0.00018065026961266994
Epoch 502/1500
  Batch 1/18, Loss: 0.00030395647627301514
  Batch 11/18, Loss: 0.0006288783042691648
Epoch 503/1500
  Batch 1/18, Loss: 0.00031798859708942473
  Batch 11/18, Loss: 0.0002725759113673121
Epoch 504/1500
  Batch 1/18, Loss: 0.0003839835699182004
  Batch 11/18, Loss: 0.0002098191762343049
Epoch 505/1500
  Batch 1/18, Loss: 0.0003035789413843304
  Batch 11/18, Loss: 0.00027179441531188786
Epoch 506/1500
  Batch 1/18, Loss: 0.00022882939083501697
  Batch 11/18, Loss: 0.0002583532768767327
Epoch 507/1500
  Batch 1/18, Loss: 0.00031926046358421445
  Batch 11/18, Loss: 0.00014430534793063998
Epoch 508/1500
  Batch 1/18, Loss: 0.0015378643292933702
  Batch 11/18, Loss: 0.00047325348714366555
Epoch 509/1500
  Batch 1/18, Loss: 0.00032269919756799936
```

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  Batch 11/18, Loss: 0.00020646065240725875
Epoch 510/1500
  Batch 1/18, Loss: 0.00044407107634469867
  Batch 11/18, Loss: 0.0002156793198082596
Epoch 511/1500
  Batch 1/18, Loss: 0.00019040417100768536
  Batch 11/18, Loss: 0.00022388568322639912
Epoch 512/1500
  Batch 1/18, Loss: 0.0003181294014211744
  Batch 11/18, Loss: 0.0006180839263834059
Epoch 513/1500
  Batch 1/18, Loss: 0.00027962494641542435
  Batch 11/18, Loss: 0.0015114496927708387
Epoch 514/1500
  Batch 1/18, Loss: 0.00019354488176759332
  Batch 11/18, Loss: 0.00038626143941655755
Epoch 515/1500
  Batch 1/18, Loss: 0.00020643268362618983
  Batch 11/18, Loss: 0.00035960329114459455
Epoch 516/1500
  Batch 1/18, Loss: 0.00021153564739506692
  Batch 11/18, Loss: 0.0003667063429020345
Epoch 517/1500
  Batch 1/18, Loss: 0.0002535731182433665
  Batch 11/18, Loss: 0.00025248376186937094
Epoch 518/1500
  Batch 1/18, Loss: 0.0001967941934708506
  Batch 11/18, Loss: 0.0002304827212356031
Epoch 519/1500
  Batch 1/18, Loss: 0.0005005873972550035
  Batch 11/18, Loss: 0.0005720120389014482
Epoch 520/1500
  Batch 1/18, Loss: 0.0002509444602765143
  Batch 11/18, Loss: 0.0006795321824029088
Epoch 521/1500
  Batch 1/18, Loss: 0.00021869527699891478
  Batch 11/18, Loss: 0.0002469572937116027
Epoch 522/1500
  Batch 1/18, Loss: 0.00031159637728706
  Batch 11/18, Loss: 0.000356775097316131
Epoch 523/1500
  Batch 1/18, Loss: 0.00027799245435744524
  Batch 11/18, Loss: 0.0002931045601144433
Epoch 524/1500
  Batch 1/18, Loss: 0.001705742790363729
  Batch 11/18, Loss: 0.0007736303959973156
Epoch 525/1500
  Batch 1/18, Loss: 0.00018011810607276857
```

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  Batch 11/18, Loss: 0.00022825899941381067
Epoch 526/1500
  Batch 1/18, Loss: 0.0001987146824831143
  Batch 11/18, Loss: 0.00016013665299396962
Epoch 527/1500
  Batch 1/18, Loss: 0.00025768030900508165
  Batch 11/18, Loss: 0.0003035477129742503
Epoch 528/1500
  Batch 1/18, Loss: 0.0001306002668570727
  Batch 11/18, Loss: 0.0014127310132607818
Epoch 529/1500
  Batch 1/18, Loss: 0.00047098431969061494
  Batch 11/18, Loss: 0.0003352943167556077
Epoch 530/1500
  Batch 1/18, Loss: 0.00020838307682424784
  Batch 11/18, Loss: 0.001465112785808742
Epoch 531/1500
  Batch 1/18, Loss: 0.00023475308262277395
  Batch 11/18, Loss: 0.00028103168006055057
Epoch 532/1500
  Batch 1/18, Loss: 0.00024276239855680615
  Batch 11/18, Loss: 0.00038380708429031074
Epoch 533/1500
  Batch 1/18, Loss: 0.00021604074572678655
  Batch 11/18, Loss: 0.00024373605265282094
Epoch 534/1500
  Batch 1/18, Loss: 0.00016081577632576227
  Batch 11/18, Loss: 0.0002791440347209573
Epoch 535/1500
  Batch 1/18, Loss: 0.0003335301298648119
  Batch 11/18, Loss: 0.00026056106435135007
Epoch 536/1500
  Batch 1/18, Loss: 0.0003379185509402305
  Batch 11/18, Loss: 0.000269623298663646
Epoch 537/1500
  Batch 1/18, Loss: 0.0003949925012420863
  Batch 11/18, Loss: 0.00023753962886985391
Epoch 538/1500
  Batch 1/18, Loss: 0.0002609543444123119
  Batch 11/18, Loss: 0.00027893524384126067
Epoch 539/1500
  Batch 1/18, Loss: 0.0003018631541635841
  Batch 11/18, Loss: 0.00028932769782841206
Epoch 540/1500
  Batch 1/18, Loss: 0.00016498957120347768
  Batch 11/18, Loss: 0.00027131804381497204
Epoch 541/1500
  Batch 1/18, Loss: 0.0002361071965424344
```

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  Batch 11/18, Loss: 0.00038309229421429336
Epoch 542/1500
  Batch 1/18, Loss: 0.00027743622194975615
  Batch 11/18, Loss: 0.00036579626612365246
Epoch 543/1500
  Batch 1/18, Loss: 0.00031540507916361094
  Batch 11/18, Loss: 0.0002692303678486496
Epoch 544/1500
  Batch 1/18, Loss: 0.00017912036855705082
  Batch 11/18, Loss: 0.0006279580411501229
Epoch 545/1500
  Batch 1/18, Loss: 0.00029831414576619864
  Batch 11/18, Loss: 0.00026901584351435304
Epoch 546/1500
  Batch 1/18, Loss: 0.00020868025603704154
  Batch 11/18, Loss: 0.00034797884291037917
Epoch 547/1500
  Batch 1/18, Loss: 0.000278019841061905
  Batch 11/18, Loss: 0.00038532636244781315
Epoch 548/1500
  Batch 1/18, Loss: 0.00026582798454910517
  Batch 11/18, Loss: 0.001453142031095922
Epoch 549/1500
  Batch 1/18, Loss: 0.000406732433475554
  Batch 11/18, Loss: 0.0002813022874761373
Epoch 550/1500
  Batch 1/18, Loss: 0.00019037083256989717
  Batch 11/18, Loss: 0.0002302277716808021
Epoch 551/1500
  Batch 1/18, Loss: 0.0002984288730658591
  Batch 11/18, Loss: 0.00025039847241714597
After epoch 550, loss=0.0003464986220933497
Epoch 552/1500
  Batch 1/18, Loss: 0.0006633560406044126
  Batch 11/18, Loss: 0.0001653488288866356
Epoch 553/1500
  Batch 1/18, Loss: 0.00032666849438101053
  Batch 11/18, Loss: 0.00025529720005579293
Epoch 554/1500
  Batch 1/18, Loss: 0.00042208563536405563
  Batch 11/18, Loss: 0.00021240752539597452
Epoch 555/1500
  Batch 1/18, Loss: 0.0003002590674441308
  Batch 11/18, Loss: 0.00033288009581156075
Epoch 556/1500
  Batch 1/18, Loss: 0.0013305505272001028
  Batch 11/18, Loss: 0.0006760975811630487
Epoch 557/1500
```

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  Batch 1/18, Loss: 0.00015648166299797595
  Batch 11/18, Loss: 0.0003708955191541463
Epoch 558/1500
  Batch 1/18, Loss: 0.00019402499310672283
  Batch 11/18, Loss: 0.0003694566839840263
Epoch 559/1500
  Batch 1/18, Loss: 0.0003291078028269112
  Batch 11/18, Loss: 0.0013856218429282308
Epoch 560/1500
  Batch 1/18, Loss: 0.0002819845685735345
  Batch 11/18, Loss: 0.0003346499870531261
Epoch 561/1500
  Batch 1/18, Loss: 0.00022994067694526166
  Batch 11/18, Loss: 0.00023148511536419392
Epoch 562/1500
  Batch 1/18, Loss: 0.00025470572290942073
  Batch 11/18, Loss: 0.00046900130109861493
Epoch 563/1500
  Batch 1/18, Loss: 0.00023773750581312925
  Batch 11/18, Loss: 0.0002905271830968559
Epoch 564/1500
  Batch 1/18, Loss: 0.00030958885326981544
  Batch 11/18, Loss: 0.00025361074949614704
Epoch 565/1500
  Batch 1/18, Loss: 0.0015803679125383496
  Batch 11/18, Loss: 0.0006305858842097223
Epoch 566/1500
  Batch 1/18, Loss: 0.00016559773939661682
  Batch 11/18, Loss: 0.00032979610841721296
Epoch 567/1500
  Batch 1/18, Loss: 0.0002650763199198991
  Batch 11/18, Loss: 0.00018556237046141177
Epoch 568/1500
  Batch 1/18, Loss: 0.00029881412046961486
  Batch 11/18, Loss: 0.0002750753774307668
Epoch 569/1500
  Batch 1/18, Loss: 0.0002880616520997137
  Batch 11/18, Loss: 0.00044827291276305914
Epoch 570/1500
  Batch 1/18, Loss: 0.0002789448481053114
  Batch 11/18, Loss: 0.00021341850515455008
Epoch 571/1500
  Batch 1/18, Loss: 0.00036089037894271314
  Batch 11/18, Loss: 0.00193411810323596
Epoch 572/1500
  Batch 1/18, Loss: 0.0012736519565805793
  Batch 11/18, Loss: 0.0001833857095334679
Epoch 573/1500
```

```
  Batch 1/18, Loss: 0.00018494045070838183
  Batch 11/18, Loss: 0.0001956223277375102
Epoch 574/1500
  Batch 1/18, Loss: 0.000172565269167535
  Batch 11/18, Loss: 0.00021429097978398204
Epoch 575/1500
  Batch 1/18, Loss: 0.00022813340183347464
  Batch 11/18, Loss: 0.0005789560382254422
Epoch 576/1500
  Batch 1/18, Loss: 0.0003464696346782148
  Batch 11/18, Loss: 0.00025606711278669536
Epoch 577/1500
  Batch 1/18, Loss: 0.000265688868239522
  Batch 11/18, Loss: 0.0002931727794930339
Epoch 578/1500
  Batch 1/18, Loss: 0.000193169922567904
  Batch 11/18, Loss: 0.0003192666044924408
Epoch 579/1500
  Batch 1/18, Loss: 0.00019538498600013554
  Batch 11/18, Loss: 0.0014548801118507981
Epoch 580/1500
  Batch 1/18, Loss: 0.00019338325364515185
  Batch 11/18, Loss: 0.00023529517056886107
Epoch 581/1500
  Batch 1/18, Loss: 0.00018438074039295316
  Batch 11/18, Loss: 0.00018556771101430058
Epoch 582/1500
  Batch 1/18, Loss: 0.0002272960264235735
  Batch 11/18, Loss: 0.00021781798568554223
Epoch 583/1500
  Batch 1/18, Loss: 0.0002177988353651017
  Batch 11/18, Loss: 0.0002520814014133066
Epoch 584/1500
  Batch 1/18, Loss: 0.0003040007140953094
  Batch 11/18, Loss: 0.00013262982247397304
Epoch 585/1500
  Batch 1/18, Loss: 0.00020392920123413205
  Batch 11/18, Loss: 0.00021891325013712049
Epoch 586/1500
  Batch 1/18, Loss: 0.0003755304496735334
  Batch 11/18, Loss: 0.0002523853909224272
Epoch 587/1500
  Batch 1/18, Loss: 0.00022777255799155682
  Batch 11/18, Loss: 0.00025943678338080645
Epoch 588/1500
  Batch 1/18, Loss: 0.0003236459451727569
  Batch 11/18, Loss: 0.00032607605680823326
Epoch 589/1500
```

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  Batch 1/18, Loss: 0.00043056686990894377
  Batch 11/18, Loss: 0.0013495521852746606
Epoch 590/1500
  Batch 1/18, Loss: 0.00033263672958128154
  Batch 11/18, Loss: 0.00029352123965509236
Epoch 591/1500
  Batch 1/18, Loss: 0.0003024144098162651
  Batch 11/18, Loss: 0.00038407588726840913
Epoch 592/1500
  Batch 1/18, Loss: 0.0004059937200509012
  Batch 11/18, Loss: 0.000178483227500692
Epoch 593/1500
  Batch 1/18, Loss: 0.0003419947170186788
  Batch 11/18, Loss: 0.0002563692396506667
Epoch 594/1500
  Batch 1/18, Loss: 0.00023917340149637312
  Batch 11/18, Loss: 0.00025979604106396437
Epoch 595/1500
  Batch 1/18, Loss: 0.00023108188179321587
  Batch 11/18, Loss: 0.00013135421613696963
Epoch 596/1500
  Batch 1/18, Loss: 0.00029220551368780434
  Batch 11/18, Loss: 0.0001553172478452325
Epoch 597/1500
  Batch 1/18, Loss: 0.00029647626797668636
  Batch 11/18, Loss: 0.00023560665431432426
Epoch 598/1500
  Batch 1/18, Loss: 0.00025471235858276486
  Batch 11/18, Loss: 0.0013060412602499127
Epoch 599/1500
  Batch 1/18, Loss: 0.0001300812145927921
  Batch 11/18, Loss: 0.0021056090481579304
Epoch 600/1500
  Batch 1/18, Loss: 0.000242866764892824
  Batch 11/18, Loss: 0.00026557332603260875
Epoch 601/1500
  Batch 1/18, Loss: 0.0002246123185614124
  Batch 11/18, Loss: 0.0003398041590116918
After epoch 600, loss=0.0002320504281669855
Epoch 602/1500
  Batch 1/18, Loss: 0.00028303396538831294
  Batch 11/18, Loss: 0.00034579841303639114
Epoch 603/1500
  Batch 1/18, Loss: 0.00017147920152638108
  Batch 11/18, Loss: 0.00028807055787183344
Epoch 604/1500
  Batch 1/18, Loss: 0.00020704913185909239
  Batch 11/18, Loss: 0.00025703277788124498
```

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Epoch 605/1500
  Batch 1/18, Loss: 0.0012639521155506372
  Batch 11/18, Loss: 0.00024702365044504404
Epoch 606/1500
  Batch 1/18, Loss: 0.0002960684068966657
  Batch 11/18, Loss: 0.0001772354735294357
Epoch 607/1500
  Batch 1/18, Loss: 0.0003086783108301461
  Batch 11/18, Loss: 0.0003090922546107322
Epoch 608/1500
  Batch 1/18, Loss: 0.0001400042965542525
  Batch 11/18, Loss: 0.00031448277877643704
Epoch 609/1500
  Batch 1/18, Loss: 0.0004006372473668307
  Batch 11/18, Loss: 0.00021437402756419033
Epoch 610/1500
  Batch 1/18, Loss: 0.0003468119539320469
  Batch 11/18, Loss: 0.00021327189460862428
Epoch 611/1500
  Batch 1/18, Loss: 0.00020910034072585404
  Batch 11/18, Loss: 0.00018247940170112997
Epoch 612/1500
  Batch 1/18, Loss: 0.00029945699498057365
  Batch 11/18, Loss: 0.0002525398740544915
Epoch 613/1500
  Batch 1/18, Loss: 0.00023175613023340702
  Batch 11/18, Loss: 0.0002677273005247116
Epoch 614/1500
  Batch 1/18, Loss: 0.0002673853887245059
  Batch 11/18, Loss: 0.0003176423779223114
Epoch 615/1500
  Batch 1/18, Loss: 0.0002710618427954614
  Batch 11/18, Loss: 0.0017368169501423836
Epoch 616/1500
  Batch 1/18, Loss: 0.00016431410040240735
  Batch 11/18, Loss: 0.0001945965195731694
Epoch 617/1500
  Batch 1/18, Loss: 0.0013209552271291614
  Batch 11/18, Loss: 0.00019641095423139632
Epoch 618/1500
  Batch 1/18, Loss: 0.00014197177370078862
  Batch 11/18, Loss: 0.0007710252539254725
Epoch 619/1500
  Batch 1/18, Loss: 0.00018953109974972904
  Batch 11/18, Loss: 0.00032859176280908287
Epoch 620/1500
  Batch 1/18, Loss: 0.0002741783391684294
  Batch 11/18, Loss: 0.00023655861150473356
```

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Epoch 621/1500
  Batch 1/18, Loss: 0.0002579495485406369
  Batch 11/18, Loss: 0.0001916875335155055
Epoch 622/1500
  Batch 1/18, Loss: 0.00024350445892196149
  Batch 11/18, Loss: 0.00019528574193827808
Epoch 623/1500
  Batch 1/18, Loss: 0.00019181387324351817
  Batch 11/18, Loss: 0.0002262795896967873
Epoch 624/1500
  Batch 1/18, Loss: 0.00017747795209288597
  Batch 11/18, Loss: 0.00030232738936319947
Epoch 625/1500
  Batch 1/18, Loss: 0.0002320015337318182
  Batch 11/18, Loss: 0.00017619052960071713
Epoch 626/1500
  Batch 1/18, Loss: 0.0001895429304568097
  Batch 11/18, Loss: 0.00020455362391658127
Epoch 627/1500
  Batch 1/18, Loss: 0.00020253156253602356
  Batch 11/18, Loss: 0.0002350101713091135
Epoch 628/1500
  Batch 1/18, Loss: 0.00022531533613801003
  Batch 11/18, Loss: 0.00019022375636268407
Epoch 629/1500
  Batch 1/18, Loss: 0.0002337366749998182
  Batch 11/18, Loss: 0.00037265371065586805
Epoch 630/1500
  Batch 1/18, Loss: 0.0002566519833635539
  Batch 11/18, Loss: 0.00022218961385078728
Epoch 631/1500
  Batch 1/18, Loss: 0.00014237339200917631
  Batch 11/18, Loss: 0.00032401212956756353
Epoch 632/1500
  Batch 1/18, Loss: 0.000537215149961412
  Batch 11/18, Loss: 0.001369583304040134
Epoch 633/1500
  Batch 1/18, Loss: 0.0001690363569650799
  Batch 11/18, Loss: 0.00016926623356994241
Epoch 634/1500
  Batch 1/18, Loss: 0.0004100602527614683
  Batch 11/18, Loss: 0.00024003892031032592
Epoch 635/1500
  Batch 1/18, Loss: 0.00017761369235813618
  Batch 11/18, Loss: 0.0002726492821238935
Epoch 636/1500
  Batch 1/18, Loss: 0.0003630279970820993
  Batch 11/18, Loss: 0.00030008592875674367
```

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Epoch 637/1500
  Batch 1/18, Loss: 0.0003117067681159824
  Batch 11/18, Loss: 0.0002525459276512265
Epoch 638/1500
  Batch 1/18, Loss: 0.00016541198419872671
  Batch 11/18, Loss: 0.00018747163994703442
Epoch 639/1500
  Batch 1/18, Loss: 0.00025885982904583216
  Batch 11/18, Loss: 0.00023761358170304447
Epoch 640/1500
  Batch 1/18, Loss: 0.00015172731946222484
  Batch 11/18, Loss: 0.00019481217896100134
Epoch 641/1500
  Batch 1/18, Loss: 0.0002018158556893468
  Batch 11/18, Loss: 0.0006660570506937802
Epoch 642/1500
  Batch 1/18, Loss: 0.00013808075163979083
  Batch 11/18, Loss: 0.0003248806460760534
Epoch 643/1500
  Batch 1/18, Loss: 0.00020341853087302297
  Batch 11/18, Loss: 0.00025026232469826937
Epoch 644/1500
  Batch 1/18, Loss: 0.0006596120074391365
  Batch 11/18, Loss: 0.0001926679688040167
Epoch 645/1500
  Batch 1/18, Loss: 0.0005862387479282916
  Batch 11/18, Loss: 0.00016122966189868748
Epoch 646/1500
  Batch 1/18, Loss: 0.00016302449512295425
  Batch 11/18, Loss: 0.0003836447140201926
Epoch 647/1500
  Batch 1/18, Loss: 0.00015471824735868722
  Batch 11/18, Loss: 0.00031268870225176215
Epoch 648/1500
  Batch 1/18, Loss: 0.0006330179166980088
  Batch 11/18, Loss: 0.00042423824197612703
Epoch 649/1500
  Batch 1/18, Loss: 0.0002936319215223193
  Batch 11/18, Loss: 0.0003313745546620339
Epoch 650/1500
  Batch 1/18, Loss: 0.0007602068944834173
  Batch 11/18, Loss: 0.0004347123031038791
Epoch 651/1500
  Batch 1/18, Loss: 0.00034314816002734005
  Batch 11/18, Loss: 0.0002286529488287302
After epoch 650, loss=0.0002556207764428109
Epoch 652/1500
  Batch 1/18, Loss: 0.0002868375740945339
```

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  Batch 11/18, Loss: 0.0003829782363027334
Epoch 653/1500
  Batch 1/18, Loss: 0.00023586256429553032
  Batch 11/18, Loss: 0.0002796532935462892
Epoch 654/1500
  Batch 1/18, Loss: 0.00037633179454132915
  Batch 11/18, Loss: 0.0002092055801767856
Epoch 655/1500
  Batch 1/18, Loss: 0.0003414143284317106
  Batch 11/18, Loss: 0.0006174860172905028
Epoch 656/1500
  Batch 1/18, Loss: 0.0002021759864874184
  Batch 11/18, Loss: 0.0002530732599552721
Epoch 657/1500
  Batch 1/18, Loss: 0.00018545641796663404
  Batch 11/18, Loss: 0.00038510706508532166
Epoch 658/1500
  Batch 1/18, Loss: 0.0002896553778555244
  Batch 11/18, Loss: 0.00020099562243558466
Epoch 659/1500
  Batch 1/18, Loss: 0.0002218356530647725
  Batch 11/18, Loss: 0.0003264890401624143
Epoch 660/1500
  Batch 1/18, Loss: 0.0002488828031346202
  Batch 11/18, Loss: 0.0002455185167491436
Epoch 661/1500
  Batch 1/18, Loss: 0.0004173176712356508
  Batch 11/18, Loss: 0.00015292321040760726
Epoch 662/1500
  Batch 1/18, Loss: 0.00030092656379565597
  Batch 11/18, Loss: 0.0003014281392097473
Epoch 663/1500
  Batch 1/18, Loss: 0.000776764762122184
  Batch 11/18, Loss: 0.00019128277199342847
Epoch 664/1500
  Batch 1/18, Loss: 0.00018272250599693507
  Batch 11/18, Loss: 0.00022479052131529897
Epoch 665/1500
  Batch 1/18, Loss: 0.0002322496147826314
  Batch 11/18, Loss: 0.000213923558476381
Epoch 666/1500
  Batch 1/18, Loss: 0.0002922650019172579
  Batch 11/18, Loss: 0.0001574308262206614
Epoch 667/1500
  Batch 1/18, Loss: 0.00025682098930701613
  Batch 11/18, Loss: 0.00030603722552768886
Epoch 668/1500
  Batch 1/18, Loss: 0.00022227242880035192
```

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  Batch 11/18, Loss: 0.00122557464055717
Epoch 669/1500
  Batch 1/18, Loss: 0.00026293168775737286
  Batch 11/18, Loss: 0.0005544606246985495
Epoch 670/1500
  Batch 1/18, Loss: 0.0012550661340355873
  Batch 11/18, Loss: 0.00023886244161985815
Epoch 671/1500
  Batch 1/18, Loss: 0.0002943449071608484
  Batch 11/18, Loss: 0.0003517706936909564
Epoch 672/1500
  Batch 1/18, Loss: 0.00023135921219363809
  Batch 11/18, Loss: 0.0006835947278887033
Epoch 673/1500
  Batch 1/18, Loss: 0.00023230221995618194
  Batch 11/18, Loss: 0.0002817223721649498
Epoch 674/1500
  Batch 1/18, Loss: 0.0001985181588679552
  Batch 11/18, Loss: 0.0001748240174492821
Epoch 675/1500
  Batch 1/18, Loss: 0.00020517813391052186
  Batch 11/18, Loss: 0.00030801701359450817
Epoch 676/1500
  Batch 1/18, Loss: 0.00014643925533164293
  Batch 11/18, Loss: 0.00023246493947226554
Epoch 677/1500
  Batch 1/18, Loss: 0.00022631033789366484
  Batch 11/18, Loss: 0.0006325677968561649
Epoch 678/1500
  Batch 1/18, Loss: 0.0005802130908705294
  Batch 11/18, Loss: 0.0002779140486381948
Epoch 679/1500
  Batch 1/18, Loss: 0.0004221741983201355
  Batch 11/18, Loss: 0.00021220470080152154
Epoch 680/1500
  Batch 1/18, Loss: 0.0003496110439300537
  Batch 11/18, Loss: 0.0002220780006609857
Epoch 681/1500
  Batch 1/18, Loss: 0.0007069532875902951
  Batch 11/18, Loss: 0.0003463721659500152
Epoch 682/1500
  Batch 1/18, Loss: 0.00025315085076726973
  Batch 11/18, Loss: 0.0002277956809848547
Epoch 683/1500
  Batch 1/18, Loss: 0.00033433359931223094
  Batch 11/18, Loss: 0.0001793231349438429
Epoch 684/1500
  Batch 1/18, Loss: 0.0002885298745241016
```

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  Batch 11/18, Loss: 0.000516544736456126
Epoch 685/1500
  Batch 1/18, Loss: 0.00015697750495746732
  Batch 11/18, Loss: 0.00028159579960629344
Epoch 686/1500
  Batch 1/18, Loss: 0.0002581734152045101
  Batch 11/18, Loss: 0.00030652416171506047
Epoch 687/1500
  Batch 1/18, Loss: 0.00019841011089738458
  Batch 11/18, Loss: 0.00027487013721838593
Epoch 688/1500
  Batch 1/18, Loss: 0.00019428135419730097
  Batch 11/18, Loss: 0.0002601983433123678
Epoch 689/1500
  Batch 1/18, Loss: 0.00031785794999450445
  Batch 11/18, Loss: 0.0003684621478896588
Epoch 690/1500
  Batch 1/18, Loss: 0.00028650229796767235
  Batch 11/18, Loss: 0.0003102314949501306
Epoch 691/1500
  Batch 1/18, Loss: 0.00020918644440826029
  Batch 11/18, Loss: 0.0002995994291268289
Epoch 692/1500
  Batch 1/18, Loss: 0.00022965218522585928
  Batch 11/18, Loss: 0.0002276991435792297
Epoch 693/1500
  Batch 1/18, Loss: 0.0004679967532865703
  Batch 11/18, Loss: 0.00033760713995434344
Epoch 694/1500
  Batch 1/18, Loss: 0.00019188792794011533
  Batch 11/18, Loss: 0.0001932553423102945
Epoch 695/1500
  Batch 1/18, Loss: 0.00019754284585360438
  Batch 11/18, Loss: 0.0003889824729412794
Epoch 696/1500
  Batch 1/18, Loss: 0.00022263001301325858
  Batch 11/18, Loss: 0.0001900535135064274
Epoch 697/1500
  Batch 1/18, Loss: 0.000274301681201905
  Batch 11/18, Loss: 0.0003791780909523368
Epoch 698/1500
  Batch 1/18, Loss: 0.0002107258333126083
  Batch 11/18, Loss: 0.0002505670126993209
Epoch 699/1500
  Batch 1/18, Loss: 0.00030289357528090477
  Batch 11/18, Loss: 0.000350084068486467
Epoch 700/1500
  Batch 1/18, Loss: 0.00032293563708662987
```

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  Batch 11/18, Loss: 0.00017725132056511939
Epoch 701/1500
  Batch 1/18, Loss: 0.00020463598775677383
  Batch 11/18, Loss: 0.000279150262940675
After epoch 700, loss=0.000293388293357566
Epoch 702/1500
  Batch 1/18, Loss: 0.00022548683045897633
  Batch 11/18, Loss: 0.0004466015670914203
Epoch 703/1500
  Batch 1/18, Loss: 0.001238883240148425
  Batch 11/18, Loss: 0.0002579657593742013
Epoch 704/1500
  Batch 1/18, Loss: 0.0003141150518786162
  Batch 11/18, Loss: 0.00029342895140871406
Epoch 705/1500
  Batch 1/18, Loss: 0.0001664586889091879
  Batch 11/18, Loss: 0.0012233894085511565
Epoch 706/1500
  Batch 1/18, Loss: 0.00020538389799185097
  Batch 11/18, Loss: 0.0002152957022190094
Epoch 707/1500
  Batch 1/18, Loss: 0.0003102837654296309
  Batch 11/18, Loss: 0.00014877828652970493
Epoch 708/1500
  Batch 1/18, Loss: 0.0013105068355798721
  Batch 11/18, Loss: 0.00015562052431050688
Epoch 709/1500
  Batch 1/18, Loss: 0.00023048900766298175
  Batch 11/18, Loss: 0.0002779476635623723
Epoch 710/1500
  Batch 1/18, Loss: 0.00023190492356661707
  Batch 11/18, Loss: 0.000206321245059371
Epoch 711/1500
  Batch 1/18, Loss: 0.000401073950342834
  Batch 11/18, Loss: 0.0004157968214713037
Epoch 712/1500
  Batch 1/18, Loss: 0.0002103059960063547
  Batch 11/18, Loss: 0.0012594577856361866
Epoch 713/1500
  Batch 1/18, Loss: 0.0003273000766057521
  Batch 11/18, Loss: 0.0002710582048166543
Epoch 714/1500
  Batch 1/18, Loss: 0.00032736166031099856
  Batch 11/18, Loss: 0.00017654214752838016
Epoch 715/1500
  Batch 1/18, Loss: 0.0002964204759337008
  Batch 11/18, Loss: 0.0002610835654195398
Epoch 716/1500
```

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  Batch 1/18, Loss: 0.0001846458180807531
  Batch 11/18, Loss: 0.0001944559917319566
Epoch 717/1500
  Batch 1/18, Loss: 0.00020361386123113334
  Batch 11/18, Loss: 0.0002601842279545963
Epoch 718/1500
  Batch 1/18, Loss: 0.00023381874780170062
  Batch 11/18, Loss: 0.0002004221169045195
Epoch 719/1500
  Batch 1/18, Loss: 0.0002653386036399752
  Batch 11/18, Loss: 0.0001604815770406276
Epoch 720/1500
  Batch 1/18, Loss: 0.00018744288536254317
  Batch 11/18, Loss: 0.00021290230506565422
Epoch 721/1500
  Batch 1/18, Loss: 0.00033792719477787614
  Batch 11/18, Loss: 0.0012012962251901627
Epoch 722/1500
  Batch 1/18, Loss: 0.00021035003010183573
  Batch 11/18, Loss: 0.00018244722741656005
Epoch 723/1500
  Batch 1/18, Loss: 0.00019988174608442932
  Batch 11/18, Loss: 0.0002727820246960666
Epoch 724/1500
  Batch 1/18, Loss: 0.00012636225437745452
  Batch 11/18, Loss: 0.0001746183552313596
Epoch 725/1500
  Batch 1/18, Loss: 0.0002866844879463315
  Batch 11/18, Loss: 0.00014178399578668177
Epoch 726/1500
  Batch 1/18, Loss: 0.0002559481072239578
  Batch 11/18, Loss: 0.00015675918257329613
Epoch 727/1500
  Batch 1/18, Loss: 0.0002114164672093466
  Batch 11/18, Loss: 0.0001959843939403072
Epoch 728/1500
  Batch 1/18, Loss: 0.00025892985286191106
  Batch 11/18, Loss: 0.0002998708514496684
Epoch 729/1500
  Batch 1/18, Loss: 0.0006586810923181474
  Batch 11/18, Loss: 0.00014144365559332073
Epoch 730/1500
  Batch 1/18, Loss: 0.00023298322048503906
  Batch 11/18, Loss: 0.0003077880246564746
Epoch 731/1500
  Batch 1/18, Loss: 0.00016060499183367938
  Batch 11/18, Loss: 0.00026381172938272357
Epoch 732/1500
```

```
  Batch 1/18, Loss: 0.00025316167739219964
  Batch 11/18, Loss: 0.00023865143884904683
Epoch 733/1500
  Batch 1/18, Loss: 0.00013970959116704762
  Batch 11/18, Loss: 0.00018778405501507223
Epoch 734/1500
  Batch 1/18, Loss: 0.0003276387869846076
  Batch 11/18, Loss: 0.00011735578300431371
Epoch 735/1500
  Batch 1/18, Loss: 0.0001745065674185753
  Batch 11/18, Loss: 0.00018638120673131198
Epoch 736/1500
  Batch 1/18, Loss: 0.0007992875762283802
  Batch 11/18, Loss: 0.00011996610555797815
Epoch 737/1500
  Batch 1/18, Loss: 0.0016385456547141075
  Batch 11/18, Loss: 0.00026618476840667427
Epoch 738/1500
  Batch 1/18, Loss: 0.00011737643944798037
  Batch 11/18, Loss: 0.0003828633634839207
Epoch 739/1500
  Batch 1/18, Loss: 0.0003818560508079827
  Batch 11/18, Loss: 0.00026545231230556965
Epoch 740/1500
  Batch 1/18, Loss: 0.00024899819982238114
  Batch 11/18, Loss: 0.0002734852605499327
Epoch 741/1500
  Batch 1/18, Loss: 0.00018820610421244055
  Batch 11/18, Loss: 0.0012017618864774704
Epoch 742/1500
  Batch 1/18, Loss: 0.0005682040355168283
  Batch 11/18, Loss: 0.00017007964197546244
Epoch 743/1500
  Batch 1/18, Loss: 0.0005654906271956861
  Batch 11/18, Loss: 0.0013152750907465816
Epoch 744/1500
  Batch 1/18, Loss: 0.00025545951211825013
  Batch 11/18, Loss: 0.00025857603759504855
Epoch 745/1500
  Batch 1/18, Loss: 0.0005957018001936376
  Batch 11/18, Loss: 0.0002442167024128139
Epoch 746/1500
  Batch 1/18, Loss: 0.00029798207106068730
  Batch 11/18, Loss: 0.0003153684956487268
Epoch 747/1500
  Batch 1/18, Loss: 0.0003466219932306558
  Batch 11/18, Loss: 0.0013208994641900063
Epoch 748/1500
```

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  Batch 1/18, Loss: 0.00016737327678129077
  Batch 11/18, Loss: 0.000615401251707226
Epoch 749/1500
  Batch 1/18, Loss: 0.001501276739872992
  Batch 11/18, Loss: 0.00025736389216035604
Epoch 750/1500
  Batch 1/18, Loss: 0.0003828644403256476
  Batch 11/18, Loss: 0.0003030308580491692
Epoch 751/1500
  Batch 1/18, Loss: 0.00018032535444945097
  Batch 11/18, Loss: 0.0001471306459279731
After epoch 750, loss=0.00011239390732953325
Epoch 752/1500
  Batch 1/18, Loss: 0.00021644719527103007
  Batch 11/18, Loss: 0.00038426456740126014
Epoch 753/1500
  Batch 1/18, Loss: 0.0002580495784059167
  Batch 11/18, Loss: 0.00055877206614241
Epoch 754/1500
  Batch 1/18, Loss: 0.0012278755893930793
  Batch 11/18, Loss: 0.00019297176913823932
Epoch 755/1500
  Batch 1/18, Loss: 0.00021194542932789773
  Batch 11/18, Loss: 0.00027719041099771857
Epoch 756/1500
  Batch 1/18, Loss: 0.00044244120363146067
  Batch 11/18, Loss: 0.0001683983427938074
Epoch 757/1500
  Batch 1/18, Loss: 0.00018312048632651567
  Batch 11/18, Loss: 0.00018137932056561112
Epoch 758/1500
  Batch 1/18, Loss: 0.00024982038303278387
  Batch 11/18, Loss: 0.00026802081265486777
Epoch 759/1500
  Batch 1/18, Loss: 0.0003227918059565127
  Batch 11/18, Loss: 0.000211579812457785
Epoch 760/1500
  Batch 1/18, Loss: 0.0005115808453410864
  Batch 11/18, Loss: 0.001355801010504365
Epoch 761/1500
  Batch 1/18, Loss: 0.0005853191833011806
  Batch 11/18, Loss: 0.0001929605205077678
Epoch 762/1500
  Batch 1/18, Loss: 0.0002948428154923022
  Batch 11/18, Loss: 0.00022599910153076053
Epoch 763/1500
  Batch 1/18, Loss: 0.00015572180564049631
  Batch 11/18, Loss: 0.0004196689114905894
```

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Epoch 764/1500
  Batch 1/18, Loss: 0.00021208496764302254
  Batch 11/18, Loss: 0.000139833617140539
Epoch 765/1500
  Batch 1/18, Loss: 0.00022699436522088945
  Batch 11/18, Loss: 0.0011945250444114208
Epoch 766/1500
  Batch 1/18, Loss: 0.00011347245890647173
  Batch 11/18, Loss: 0.0001935390755534172
Epoch 767/1500
  Batch 1/18, Loss: 0.00024027879408095032
  Batch 11/18, Loss: 0.0002769099664874375
Epoch 768/1500
  Batch 1/18, Loss: 0.0002402565150987357
  Batch 11/18, Loss: 0.0001506769040133804
Epoch 769/1500
  Batch 1/18, Loss: 0.00013680584379471838
  Batch 11/18, Loss: 0.00033292965963482857
Epoch 770/1500
  Batch 1/18, Loss: 0.00026732610422186553
  Batch 11/18, Loss: 0.00025406989152543247
Epoch 771/1500
  Batch 1/18, Loss: 0.00020887787104584277
  Batch 11/18, Loss: 0.0001663618750171736
Epoch 772/1500
  Batch 1/18, Loss: 0.00042386900167912245
  Batch 11/18, Loss: 0.00026002919184975326
Epoch 773/1500
  Batch 1/18, Loss: 0.000214677449548617
  Batch 11/18, Loss: 0.0006261918460950255
Epoch 774/1500
  Batch 1/18, Loss: 0.00023134294315241277
  Batch 11/18, Loss: 0.00017160203424282372
Epoch 775/1500
  Batch 1/18, Loss: 0.00014576576359104365
  Batch 11/18, Loss: 0.0002413003852998167
Epoch 776/1500
  Batch 1/18, Loss: 0.00018070419901050627
  Batch 11/18, Loss: 0.001159587176516652
Epoch 777/1500
  Batch 1/18, Loss: 0.0003217656339984387
  Batch 11/18, Loss: 0.00038764672353863716
Epoch 778/1500
  Batch 1/18, Loss: 0.00039376626955345273
  Batch 11/18, Loss: 0.001319454051554203
Epoch 779/1500
  Batch 1/18, Loss: 0.0002037727099377662
  Batch 11/18, Loss: 0.0003557594900485128
```

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Epoch 780/1500
  Batch 1/18, Loss: 0.00018108052609022707
  Batch 11/18, Loss: 0.00025489251129329205
Epoch 781/1500
  Batch 1/18, Loss: 0.00035091678728349507
  Batch 11/18, Loss: 0.0004598189552780241
Epoch 782/1500
  Batch 1/18, Loss: 0.0002415367343928665
  Batch 11/18, Loss: 0.0002886363072320819
Epoch 783/1500
  Batch 1/18, Loss: 0.00012106839858461171
  Batch 11/18, Loss: 0.00024760173982940614
Epoch 784/1500
  Batch 1/18, Loss: 0.00022445927606895566
  Batch 11/18, Loss: 0.00019455428991932422
Epoch 785/1500
  Batch 1/18, Loss: 0.0002133913803845644
  Batch 11/18, Loss: 0.0005487387534230947
Epoch 786/1500
  Batch 1/18, Loss: 0.0006901659653522074
  Batch 11/18, Loss: 0.00011106849706266075
Epoch 787/1500
  Batch 1/18, Loss: 0.00032903594546951354
  Batch 11/18, Loss: 0.00028204324189573526
Epoch 788/1500
  Batch 1/18, Loss: 0.0002325659297639504
  Batch 11/18, Loss: 0.0001548758737044409
Epoch 789/1500
  Batch 1/18, Loss: 0.00021575004211626947
  Batch 11/18, Loss: 0.0002496231463737786
Epoch 790/1500
  Batch 1/18, Loss: 0.0002657477161847055
  Batch 11/18, Loss: 0.00043197203194722533
Epoch 791/1500
  Batch 1/18, Loss: 0.0001929249701788649
  Batch 11/18, Loss: 0.0003309586027171463
Epoch 792/1500
  Batch 1/18, Loss: 0.0005211552488617599
  Batch 11/18, Loss: 0.0001227894681505859
Epoch 793/1500
  Batch 1/18, Loss: 0.0002582260931376368
  Batch 11/18, Loss: 0.00024026069149840623
Epoch 794/1500
  Batch 1/18, Loss: 0.00021542652393691242
  Batch 11/18, Loss: 0.0013769986107945442
Epoch 795/1500
  Batch 1/18, Loss: 0.0001581076066941023
  Batch 11/18, Loss: 0.0002575546386651695
```

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Epoch 796/1500
  Batch 1/18, Loss: 0.00025545089738443494
  Batch 11/18, Loss: 0.00033396537764929235
Epoch 797/1500
  Batch 1/18, Loss: 0.00021131944959051907
  Batch 11/18, Loss: 0.00021833770733792335
Epoch 798/1500
  Batch 1/18, Loss: 0.00031243410194292665
  Batch 11/18, Loss: 0.00023593063815496862
Epoch 799/1500
  Batch 1/18, Loss: 0.0003772612544707954
  Batch 11/18, Loss: 0.00021886259492021054
Epoch 800/1500
  Batch 1/18, Loss: 0.00013203400885686278
  Batch 11/18, Loss: 0.00025906861992552876
Epoch 801/1500
  Batch 1/18, Loss: 0.00025308228214271367
  Batch 11/18, Loss: 0.00020078325178474188
After epoch 800, loss=0.00023005552066024393
Epoch 802/1500
  Batch 1/18, Loss: 0.00024907244369387627
  Batch 11/18, Loss: 0.00019694934599101543
Epoch 803/1500
  Batch 1/18, Loss: 0.00033191393595188856
  Batch 11/18, Loss: 0.00019950744172092527
Epoch 804/1500
  Batch 1/18, Loss: 0.00017898912483360618
  Batch 11/18, Loss: 0.00019840025925077498
Epoch 805/1500
  Batch 1/18, Loss: 0.0002252202684758231
  Batch 11/18, Loss: 0.00027654171572066844
Epoch 806/1500
  Batch 1/18, Loss: 0.00016016323934309185
  Batch 11/18, Loss: 0.00022462254855781794
Epoch 807/1500
  Batch 1/18, Loss: 0.0003012519155163318
  Batch 11/18, Loss: 0.0016673874342814088
Epoch 808/1500
  Batch 1/18, Loss: 0.00030054827220737934
  Batch 11/18, Loss: 0.00022014891146682203
Epoch 809/1500
  Batch 1/18, Loss: 0.0001990846503758803
  Batch 11/18, Loss: 0.00014977992395870388
Epoch 810/1500
  Batch 1/18, Loss: 0.0004278800333850086
  Batch 11/18, Loss: 0.0001872953143902123
Epoch 811/1500
  Batch 1/18, Loss: 0.0002116536779794842
```

```
  Batch 11/18, Loss: 0.0007171331671997905
Epoch 812/1500
  Batch 1/18, Loss: 0.00014381128130480647
  Batch 11/18, Loss: 0.00015987598453648388
Epoch 813/1500
  Batch 1/18, Loss: 0.0001522148959338665
  Batch 11/18, Loss: 0.0004138288786634803
Epoch 814/1500
  Batch 1/18, Loss: 0.00015080865705385804
  Batch 11/18, Loss: 0.0004163677804172039
Epoch 815/1500
  Batch 1/18, Loss: 0.0002344669628655538
  Batch 11/18, Loss: 0.00025473584537394345
Epoch 816/1500
  Batch 1/18, Loss: 0.0006096112192608416
  Batch 11/18, Loss: 0.0002250780671602115
Epoch 817/1500
  Batch 1/18, Loss: 0.00028798525454476476
  Batch 11/18, Loss: 0.0002173481188947335
Epoch 818/1500
  Batch 1/18, Loss: 0.00024907561601139605
  Batch 11/18, Loss: 0.00020756815501954406
Epoch 819/1500
  Batch 1/18, Loss: 0.0005175339174456894
  Batch 11/18, Loss: 0.00024149198725353926
Epoch 820/1500
  Batch 1/18, Loss: 0.0001472796284360811
  Batch 11/18, Loss: 0.00019988941494375467
Epoch 821/1500
  Batch 1/18, Loss: 0.0011739239562302828
  Batch 11/18, Loss: 0.00018367696611676365
Epoch 822/1500
  Batch 1/18, Loss: 0.0002587297058198601
  Batch 11/18, Loss: 0.000151510612340644
Epoch 823/1500
  Batch 1/18, Loss: 0.00014942472625989467
  Batch 11/18, Loss: 0.0004725116596091538
Epoch 824/1500
  Batch 1/18, Loss: 0.00016944430535659194
  Batch 11/18, Loss: 0.00024468480842188
Epoch 825/1500
  Batch 1/18, Loss: 0.00047050314606167376
  Batch 11/18, Loss: 0.0005897855153307319
Epoch 826/1500
  Batch 1/18, Loss: 0.00014773460861761123
  Batch 11/18, Loss: 0.00013296557881403714
Epoch 827/1500
  Batch 1/18, Loss: 0.00031959585612639785
```

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  Batch 11/18, Loss: 0.00021738637587986887
Epoch 828/1500
  Batch 1/18, Loss: 0.00022962258663028479
  Batch 11/18, Loss: 0.000278372346656397
Epoch 829/1500
  Batch 1/18, Loss: 0.00025185567210428417
  Batch 11/18, Loss: 0.00014585039753001183
Epoch 830/1500
  Batch 1/18, Loss: 0.0005806528497487307
  Batch 11/18, Loss: 0.00020246204803697765
Epoch 831/1500
  Batch 1/18, Loss: 0.00041498473729006946
  Batch 11/18, Loss: 0.0003201457147952169
Epoch 832/1500
  Batch 1/18, Loss: 0.0002222218899987638
  Batch 11/18, Loss: 0.00026092788903042674
Epoch 833/1500
  Batch 1/18, Loss: 0.0001982783287530765
  Batch 11/18, Loss: 0.0004416945157572627
Epoch 834/1500
  Batch 1/18, Loss: 0.00017021055100485682
  Batch 11/18, Loss: 0.0002533334190957248
Epoch 835/1500
  Batch 1/18, Loss: 0.00018508106586523354
  Batch 11/18, Loss: 0.0002630960661917925
Epoch 836/1500
  Batch 1/18, Loss: 0.00014468037988990545
  Batch 11/18, Loss: 0.0002656778960954398
Epoch 837/1500
  Batch 1/18, Loss: 0.0012017580447718501
  Batch 11/18, Loss: 0.0008290756959468126
Epoch 838/1500
  Batch 1/18, Loss: 0.00033406587317585945
  Batch 11/18, Loss: 0.00028291757917031646
Epoch 839/1500
  Batch 1/18, Loss: 0.00026183619047515094
  Batch 11/18, Loss: 0.00028975773602724075
Epoch 840/1500
  Batch 1/18, Loss: 0.00018714944599196315
  Batch 11/18, Loss: 0.00017021209350787103
Epoch 841/1500
  Batch 1/18, Loss: 0.00019468736718408763
  Batch 11/18, Loss: 0.0002216765860794112
Epoch 842/1500
  Batch 1/18, Loss: 0.00023642067390028387
  Batch 11/18, Loss: 0.00015481471200473607
Epoch 843/1500
  Batch 1/18, Loss: 0.00033697689650580287
```

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  Batch 11/18, Loss: 0.0002350339200347662
Epoch 844/1500
  Batch 1/18, Loss: 0.00010298770939698443
  Batch 11/18, Loss: 0.0003501136670820415
Epoch 845/1500
  Batch 1/18, Loss: 0.00017142690194305032
  Batch 11/18, Loss: 0.00017606132314540446
Epoch 846/1500
  Batch 1/18, Loss: 0.00034175312612205744
  Batch 11/18, Loss: 0.00016858222079463303
Epoch 847/1500
  Batch 1/18, Loss: 0.000189421305549331
  Batch 11/18, Loss: 0.00014528488100040704
Epoch 848/1500
  Batch 1/18, Loss: 0.00014297777670435607
  Batch 11/18, Loss: 0.0001543709367979318
Epoch 849/1500
  Batch 1/18, Loss: 0.00013563333777710795
  Batch 11/18, Loss: 0.0005621769232675433
Epoch 850/1500
  Batch 1/18, Loss: 0.0013721365248784423
  Batch 11/18, Loss: 0.00014471962640527636
Epoch 851/1500
  Batch 1/18, Loss: 0.0002885946596506983
  Batch 11/18, Loss: 0.0002194461558246985
After epoch 850, loss=0.00024037208640947938
Epoch 852/1500
  Batch 1/18, Loss: 0.0001904396922327578
  Batch 11/18, Loss: 0.00038009879062883556
Epoch 853/1500
  Batch 1/18, Loss: 0.0001630441111046821
  Batch 11/18, Loss: 0.00022577626805286855
Epoch 854/1500
  Batch 1/18, Loss: 0.00026900338707491755
  Batch 11/18, Loss: 0.00024315278278663754
Epoch 855/1500
  Batch 1/18, Loss: 0.00016794155817478895
  Batch 11/18, Loss: 0.0002017946681007743
Epoch 856/1500
  Batch 1/18, Loss: 0.00022294926748145372
  Batch 11/18, Loss: 0.001117443898692727
Epoch 857/1500
  Batch 1/18, Loss: 0.00013909161498304456
  Batch 11/18, Loss: 0.00022345525212585926
Epoch 858/1500
  Batch 1/18, Loss: 0.0004099115030840039
  Batch 11/18, Loss: 0.0011227211216464639
Epoch 859/1500
```

```
  Batch 1/18, Loss: 0.00014093999925535172
  Batch 11/18, Loss: 0.0003480227314867079
Epoch 860/1500
  Batch 1/18, Loss: 0.00015562333283014596
  Batch 11/18, Loss: 0.00018099007138516754
Epoch 861/1500
  Batch 1/18, Loss: 0.00025714444927871227
  Batch 11/18, Loss: 0.0002472435007803142
Epoch 862/1500
  Batch 1/18, Loss: 0.0003874879330396652
  Batch 11/18, Loss: 0.00028917985036969185
Epoch 863/1500
  Batch 1/18, Loss: 0.00020836456678807735
  Batch 11/18, Loss: 0.00026979504036717117
Epoch 864/1500
  Batch 1/18, Loss: 0.0003904326003976166
  Batch 11/18, Loss: 0.00014130491763353348
Epoch 865/1500
  Batch 1/18, Loss: 0.0002129232743754983
  Batch 11/18, Loss: 0.00017987997853197157
Epoch 866/1500
  Batch 1/18, Loss: 0.00030496728140860796
  Batch 11/18, Loss: 0.00029951182659715414
Epoch 867/1500
  Batch 1/18, Loss: 0.0001530544104753062
  Batch 11/18, Loss: 0.0002602094318717718
Epoch 868/1500
  Batch 1/18, Loss: 0.0001463067892473191
  Batch 11/18, Loss: 0.00022767596237827092
Epoch 869/1500
  Batch 1/18, Loss: 0.0002243703493149951
  Batch 11/18, Loss: 0.00013924381346441805
Epoch 870/1500
  Batch 1/18, Loss: 0.00028493385782610625
  Batch 11/18, Loss: 0.00024189442046917975
Epoch 871/1500
  Batch 1/18, Loss: 0.00030120176961645484
  Batch 11/18, Loss: 0.0011847064597532153
Epoch 872/1500
  Batch 1/18, Loss: 0.00028641303651966155
  Batch 11/18, Loss: 0.00027921449509449303
Epoch 873/1500
  Batch 1/18, Loss: 0.00022370250371750444
  Batch 11/18, Loss: 0.00047429525875486434
Epoch 874/1500
  Batch 1/18, Loss: 0.00019028854148928076
  Batch 11/18, Loss: 0.00019004131900146604
Epoch 875/1500
```

```
  Batch 1/18, Loss: 0.00022769095085095614
  Batch 11/18, Loss: 0.0001568688894622028
Epoch 876/1500
  Batch 1/18, Loss: 0.00015006744069978595
  Batch 11/18, Loss: 0.00017306247900705785
Epoch 877/1500
  Batch 1/18, Loss: 0.0003604719240684062
  Batch 11/18, Loss: 0.0002341271610930562
Epoch 878/1500
  Batch 1/18, Loss: 0.00024230244162026793
  Batch 11/18, Loss: 0.0005673182895407081
Epoch 879/1500
  Batch 1/18, Loss: 0.00018071210070047528
  Batch 11/18, Loss: 0.000293499615509063
Epoch 880/1500
  Batch 1/18, Loss: 0.00019963632803410292
  Batch 11/18, Loss: 0.00032507150899618864
Epoch 881/1500
  Batch 1/18, Loss: 0.0011246296344324946
  Batch 11/18, Loss: 0.00036529015051200986
Epoch 882/1500
  Batch 1/18, Loss: 0.00023834564490243793
  Batch 11/18, Loss: 0.00025160491350106895
Epoch 883/1500
  Batch 1/18, Loss: 0.0001388859818689525
  Batch 11/18, Loss: 0.0003211912408005446
Epoch 884/1500
  Batch 1/18, Loss: 0.0007677365210838616
  Batch 11/18, Loss: 0.0001934421161422506
Epoch 885/1500
  Batch 1/18, Loss: 0.00023124426661524922
  Batch 11/18, Loss: 0.00045509275514632463
Epoch 886/1500
  Batch 1/18, Loss: 0.0002525162126403302
  Batch 11/18, Loss: 0.00020491122268140316
Epoch 887/1500
  Batch 1/18, Loss: 0.00015872826043050736
  Batch 11/18, Loss: 0.00016806405619718134
Epoch 888/1500
  Batch 1/18, Loss: 0.00020353389845695347
  Batch 11/18, Loss: 0.00021729324362240732
Epoch 889/1500
  Batch 1/18, Loss: 0.0003708766889758408
  Batch 11/18, Loss: 0.00022950187849346548
Epoch 890/1500
  Batch 1/18, Loss: 0.0001741141313686967
  Batch 11/18, Loss: 0.0002323977096239105
Epoch 891/1500
```

```
  Batch 1/18, Loss: 0.0002475368673913181
  Batch 11/18, Loss: 0.00019651217735372484
Epoch 892/1500
  Batch 1/18, Loss: 0.00017926542204804718
  Batch 11/18, Loss: 0.0015010946663096547
Epoch 893/1500
  Batch 1/18, Loss: 0.0001856863673310727
  Batch 11/18, Loss: 0.00021596616716124117
Epoch 894/1500
  Batch 1/18, Loss: 0.00019368554058019072
  Batch 11/18, Loss: 0.00013973760360386223
Epoch 895/1500
  Batch 1/18, Loss: 0.00017124271835200489
  Batch 11/18, Loss: 0.00015755603089928627
Epoch 896/1500
  Batch 1/18, Loss: 0.0011137300170958042
  Batch 11/18, Loss: 0.00043033453403040767
Epoch 897/1500
  Batch 1/18, Loss: 0.00014598050620406866
  Batch 11/18, Loss: 0.0005759149789810181
Epoch 898/1500
  Batch 1/18, Loss: 0.00021663028746843338
  Batch 11/18, Loss: 0.0005923631833866239
Epoch 899/1500
  Batch 1/18, Loss: 0.00017727460362948477
  Batch 11/18, Loss: 0.0011707530356943607
Epoch 900/1500
  Batch 1/18, Loss: 0.00016940056229941547
  Batch 11/18, Loss: 0.00018382551206741482
Epoch 901/1500
  Batch 1/18, Loss: 0.0004106038250029087
  Batch 11/18, Loss: 0.00022061914205551147
After epoch 900, loss=0.00016042536299210042
Epoch 902/1500
  Batch 1/18, Loss: 0.0007803526823408902
  Batch 11/18, Loss: 0.00021364411804825068
Epoch 903/1500
  Batch 1/18, Loss: 0.0002837515203282237
  Batch 11/18, Loss: 0.0011090742191299796
Epoch 904/1500
  Batch 1/18, Loss: 0.00022583721147384495
  Batch 11/18, Loss: 0.0002711667330004275
Epoch 905/1500
  Batch 1/18, Loss: 0.0006549290264956653
  Batch 11/18, Loss: 0.00018595847359392792
Epoch 906/1500
  Batch 1/18, Loss: 0.000166387835633941
  Batch 11/18, Loss: 0.0012639211490750313
```

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Epoch 907/1500
  Batch 1/18, Loss: 0.0002737554023042321
  Batch 11/18, Loss: 0.00016434653662145138
Epoch 908/1500
  Batch 1/18, Loss: 0.00025868869852274656
  Batch 11/18, Loss: 0.00025852260296233
Epoch 909/1500
  Batch 1/18, Loss: 0.00031400431180372834
  Batch 11/18, Loss: 0.0005841508391313255
Epoch 910/1500
  Batch 1/18, Loss: 0.00024400655820500106
  Batch 11/18, Loss: 0.0002732898574322462
Epoch 911/1500
  Batch 1/18, Loss: 0.000303672015434131
  Batch 11/18, Loss: 0.00030125226476229727
Epoch 912/1500
  Batch 1/18, Loss: 0.00022409103985410184
  Batch 11/18, Loss: 0.00014152801304589957
Epoch 913/1500
  Batch 1/18, Loss: 0.0007895224262028933
  Batch 11/18, Loss: 0.00016982649685814977
Epoch 914/1500
  Batch 1/18, Loss: 0.00019311398500576615
  Batch 11/18, Loss: 0.00011018187797162682
Epoch 915/1500
  Batch 1/18, Loss: 0.00024692880106158555
  Batch 11/18, Loss: 0.00023563997820019722
Epoch 916/1500
  Batch 1/18, Loss: 0.00026981643168255687
  Batch 11/18, Loss: 0.0001433018915122375
Epoch 917/1500
  Batch 1/18, Loss: 0.0002716751769185066
  Batch 11/18, Loss: 0.00019514354062266648
Epoch 918/1500
  Batch 1/18, Loss: 0.0003028127539437264
  Batch 11/18, Loss: 0.00021907227346673608
Epoch 919/1500
  Batch 1/18, Loss: 0.00021007578470744193
  Batch 11/18, Loss: 0.0003259987570345402
Epoch 920/1500
  Batch 1/18, Loss: 0.00047284489846788347
  Batch 11/18, Loss: 0.00029427907429635525
Epoch 921/1500
  Batch 1/18, Loss: 0.0001272617228096351
  Batch 11/18, Loss: 0.00018681914662010968
Epoch 922/1500
  Batch 1/18, Loss: 0.0001800592290237546
  Batch 11/18, Loss: 0.00010887315875152126
```

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Epoch 923/1500
  Batch 1/18, Loss: 0.00014261298929341137
  Batch 11/18, Loss: 0.00016540173965040594
Epoch 924/1500
  Batch 1/18, Loss: 0.00017842916713561863
  Batch 11/18, Loss: 0.00019682702259160578
Epoch 925/1500
  Batch 1/18, Loss: 0.00043917918810620904
  Batch 11/18, Loss: 0.0005561271100305021
Epoch 926/1500
  Batch 1/18, Loss: 0.00018842340796254575
  Batch 11/18, Loss: 0.0013779564760625362
Epoch 927/1500
  Batch 1/18, Loss: 0.0006503778859041631
  Batch 11/18, Loss: 0.00017141910211648792
Epoch 928/1500
  Batch 1/18, Loss: 0.00027823526761494577
  Batch 11/18, Loss: 0.0002524745650589466
Epoch 929/1500
  Batch 1/18, Loss: 0.0001814260904211551
  Batch 11/18, Loss: 0.00024815250071696937
Epoch 930/1500
  Batch 1/18, Loss: 0.0005356048932299018
  Batch 11/18, Loss: 0.00035632005892693996
Epoch 931/1500
  Batch 1/18, Loss: 0.0004949751310050488
  Batch 11/18, Loss: 0.0001416624872945249
Epoch 932/1500
  Batch 1/18, Loss: 0.00021666470274794847
  Batch 11/18, Loss: 0.0010806899517774582
Epoch 933/1500
  Batch 1/18, Loss: 0.0011802252847701311
  Batch 11/18, Loss: 0.0002071206399705261
Epoch 934/1500
  Batch 1/18, Loss: 0.0003835410170722753
  Batch 11/18, Loss: 0.00043419425492174923
Epoch 935/1500
  Batch 1/18, Loss: 0.00011476482904981822
  Batch 11/18, Loss: 0.00024170856340788305
Epoch 936/1500
  Batch 1/18, Loss: 0.0005829194560647011
  Batch 11/18, Loss: 0.00023335036530625075
Epoch 937/1500
  Batch 1/18, Loss: 0.00048101029824465513
  Batch 11/18, Loss: 0.0001523762330180034
Epoch 938/1500
  Batch 1/18, Loss: 0.0005823284154757857
  Batch 11/18, Loss: 0.00044727890053763986
```

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Epoch 939/1500
  Batch 1/18, Loss: 0.00017135859525296837
  Batch 11/18, Loss: 0.00031925985240377486
Epoch 940/1500
  Batch 1/18, Loss: 0.0005056667141616344
  Batch 11/18, Loss: 0.0002773818850982934
Epoch 941/1500
  Batch 1/18, Loss: 0.00018696821643970907
  Batch 11/18, Loss: 0.00023516672081314027
Epoch 942/1500
  Batch 1/18, Loss: 0.0001432974822819233
  Batch 11/18, Loss: 0.00019466597586870193
Epoch 943/1500
  Batch 1/18, Loss: 0.0006982730701565742
  Batch 11/18, Loss: 0.00019385720952413976
Epoch 944/1500
  Batch 1/18, Loss: 0.00022081985662225634
  Batch 11/18, Loss: 0.0004823838244192302
Epoch 945/1500
  Batch 1/18, Loss: 0.00022559065837413073
  Batch 11/18, Loss: 0.00021773100888822228
Epoch 946/1500
  Batch 1/18, Loss: 0.00012352591147646308
  Batch 11/18, Loss: 0.00041619635885581374
Epoch 947/1500
  Batch 1/18, Loss: 0.000292853539576754
  Batch 11/18, Loss: 0.00022163527319207788
Epoch 948/1500
  Batch 1/18, Loss: 0.0003746528527699411
  Batch 11/18, Loss: 0.0002441930992063135
Epoch 949/1500
  Batch 1/18, Loss: 0.0002208217338193208
  Batch 11/18, Loss: 0.00018028999329544604
Epoch 950/1500
  Batch 1/18, Loss: 0.0006664886022917926
  Batch 11/18, Loss: 0.000177947455085814
Epoch 951/1500
  Batch 1/18, Loss: 0.0002282215136801824
  Batch 11/18, Loss: 0.00020269182277843356
After epoch 950, loss=0.00032424996607005596
Epoch 952/1500
  Batch 1/18, Loss: 0.0004160981043241918
  Batch 11/18, Loss: 0.00017327556270174682
Epoch 953/1500
  Batch 1/18, Loss: 0.00012658243940677494
  Batch 11/18, Loss: 0.00020636596309486777
Epoch 954/1500
  Batch 1/18, Loss: 0.000151472442667
```

```
  Batch 11/18, Loss: 0.00040906068170443177
Epoch 955/1500
  Batch 1/18, Loss: 0.00022222683764994144
  Batch 11/18, Loss: 0.000306581670884043
Epoch 956/1500
  Batch 1/18, Loss: 0.00041174094076268375
  Batch 11/18, Loss: 0.00013272662181407213
Epoch 957/1500
  Batch 1/18, Loss: 0.00023991642228793353
  Batch 11/18, Loss: 0.000289165967842564
Epoch 958/1500
  Batch 1/18, Loss: 0.0002002990513574332
  Batch 11/18, Loss: 0.000351416296325624
Epoch 959/1500
  Batch 1/18, Loss: 0.00018325337441638112
  Batch 11/18, Loss: 0.00011065533180953935
Epoch 960/1500
  Batch 1/18, Loss: 0.00038639301783405244
  Batch 11/18, Loss: 0.00021517006098292768
Epoch 961/1500
  Batch 1/18, Loss: 0.00015363862621597946
  Batch 11/18, Loss: 0.00020101129484828562
Epoch 962/1500
  Batch 1/18, Loss: 0.00023003203386906534
  Batch 11/18, Loss: 0.0003007470804732293
Epoch 963/1500
  Batch 1/18, Loss: 0.0001590268948348239
  Batch 11/18, Loss: 0.00037140888161957264
Epoch 964/1500
  Batch 1/18, Loss: 0.00017594652308616787
  Batch 11/18, Loss: 0.00019909025286324322
Epoch 965/1500
  Batch 1/18, Loss: 0.00016807987412903458
  Batch 11/18, Loss: 0.00036688006366603076
Epoch 966/1500
  Batch 1/18, Loss: 0.0004342872416600585
  Batch 11/18, Loss: 0.0010491287102922797
Epoch 967/1500
  Batch 1/18, Loss: 0.0001271665678359568
  Batch 11/18, Loss: 0.0001992176112253219
Epoch 968/1500
  Batch 1/18, Loss: 0.0002022032713284716
  Batch 11/18, Loss: 0.00019011534459423274
Epoch 969/1500
  Batch 1/18, Loss: 0.00014954640937503427
  Batch 11/18, Loss: 0.00019029848044738173
Epoch 970/1500
  Batch 1/18, Loss: 0.00012316199718043208
```

```
  Batch 11/18, Loss: 0.00016783640603534877
Epoch 971/1500
  Batch 1/18, Loss: 0.0004036446916870773
  Batch 11/18, Loss: 0.0006093459669500589
Epoch 972/1500
  Batch 1/18, Loss: 0.00019779420108534396
  Batch 11/18, Loss: 0.00013516303442884237
Epoch 973/1500
  Batch 1/18, Loss: 0.0006221993244253099
  Batch 11/18, Loss: 0.00014253090193960816
Epoch 974/1500
  Batch 1/18, Loss: 0.00022381875896826386
  Batch 11/18, Loss: 0.00019559274369385093
Epoch 975/1500
  Batch 1/18, Loss: 0.00019764273019973189
  Batch 11/18, Loss: 0.0001102183450711891
Epoch 976/1500
  Batch 1/18, Loss: 0.0002140633441740647
  Batch 11/18, Loss: 0.0001515606272732839
Epoch 977/1500
  Batch 1/18, Loss: 0.0005332561559043825
  Batch 11/18, Loss: 0.0002350343274883926
Epoch 978/1500
  Batch 1/18, Loss: 0.00017741063493303955
  Batch 11/18, Loss: 0.0002235516585642472
Epoch 979/1500
  Batch 1/18, Loss: 0.000638989033177495
  Batch 11/18, Loss: 0.00012703801621682942
Epoch 980/1500
  Batch 1/18, Loss: 0.0001781431055860594
  Batch 11/18, Loss: 0.00039214835851453245
Epoch 981/1500
  Batch 1/18, Loss: 0.00014615223335567862
  Batch 11/18, Loss: 0.00020741226035170257
Epoch 982/1500
  Batch 1/18, Loss: 0.00019732020155061036
  Batch 11/18, Loss: 0.00028473554993979633
Epoch 983/1500
  Batch 1/18, Loss: 0.0001940267684403807
  Batch 11/18, Loss: 0.00016784325998742133
Epoch 984/1500
  Batch 1/18, Loss: 0.0002462358388584107
  Batch 11/18, Loss: 0.00019442319171503186
Epoch 985/1500
  Batch 1/18, Loss: 0.00012174568109912798
  Batch 11/18, Loss: 0.00030855723889544606
Epoch 986/1500
  Batch 1/18, Loss: 0.0001206978558911942
```

```
  Batch 11/18, Loss: 0.0006255260086618364
Epoch 987/1500
  Batch 1/18, Loss: 0.0001608479506103322
  Batch 11/18, Loss: 0.00013103586388751864
Epoch 988/1500
  Batch 1/18, Loss: 0.00019411722314544022
  Batch 11/18, Loss: 0.0004825786454603076
Epoch 989/1500
  Batch 1/18, Loss: 0.00017163240408990532
  Batch 11/18, Loss: 0.0003716111823450774
Epoch 990/1500
  Batch 1/18, Loss: 0.00024316404596690243
  Batch 11/18, Loss: 0.00012256030458956957
Epoch 991/1500
  Batch 1/18, Loss: 0.00020302613847889006
  Batch 11/18, Loss: 0.00024609878892078996
Epoch 992/1500
  Batch 1/18, Loss: 0.00023158996191341243
  Batch 11/18, Loss: 0.0003347029851283878
Epoch 993/1500
  Batch 1/18, Loss: 0.0003007652412634343
  Batch 11/18, Loss: 0.00024167333322111517
Epoch 994/1500
  Batch 1/18, Loss: 0.0001369714445900172
  Batch 11/18, Loss: 0.00109987857285887
Epoch 995/1500
  Batch 1/18, Loss: 0.0005658076843246818
  Batch 11/18, Loss: 0.00015858010738156736
Epoch 996/1500
  Batch 1/18, Loss: 0.00020470745221246034
  Batch 11/18, Loss: 0.00034143883385695517
Epoch 997/1500
  Batch 1/18, Loss: 0.0002723309735301882
  Batch 11/18, Loss: 0.00024028815096244216
Epoch 998/1500
  Batch 1/18, Loss: 0.00026116016670130193
  Batch 11/18, Loss: 0.000628463109023869
Epoch 999/1500
  Batch 1/18, Loss: 0.000144261954119429
  Batch 11/18, Loss: 0.0002284540532855317
Epoch 1000/1500
  Batch 1/18, Loss: 0.00042672757990658283
  Batch 11/18, Loss: 0.00016409321688115597
Epoch 1001/1500
  Batch 1/18, Loss: 0.00037379228160716593
  Batch 11/18, Loss: 0.00023395093739964068
After epoch 1000, loss=0.0005238935700617731
Epoch 1002/1500
```

```
  Batch 1/18, Loss: 0.00022834385163150728
  Batch 11/18, Loss: 0.00011632333917077631
Epoch 1003/1500
  Batch 1/18, Loss: 0.00016371847596019506
  Batch 11/18, Loss: 0.0002148335479432717
Epoch 1004/1500
  Batch 1/18, Loss: 0.00013124974793754518
  Batch 11/18, Loss: 0.00013925870007369667
Epoch 1005/1500
  Batch 1/18, Loss: 0.0001829104876378551
  Batch 11/18, Loss: 0.0002322475629625842
Epoch 1006/1500
  Batch 1/18, Loss: 0.00013387772196438164
  Batch 11/18, Loss: 0.00020939615205861628
Epoch 1007/1500
  Batch 1/18, Loss: 0.0002227428340120241
  Batch 11/18, Loss: 0.00015126357902772725
Epoch 1008/1500
  Batch 1/18, Loss: 0.00023178831906989217
  Batch 11/18, Loss: 0.00018385380099061877
Epoch 1009/1500
  Batch 1/18, Loss: 0.00016518864140380174
  Batch 11/18, Loss: 0.0001576449431013316
Epoch 1010/1500
  Batch 1/18, Loss: 0.0002058982354355976
  Batch 11/18, Loss: 0.00024799403036013246
Epoch 1011/1500
  Batch 1/18, Loss: 0.00020110201148781925
  Batch 11/18, Loss: 0.0003243126266170293
Epoch 1012/1500
  Batch 1/18, Loss: 0.00032664681202732027
  Batch 11/18, Loss: 0.00013674642832484096
Epoch 1013/1500
  Batch 1/18, Loss: 0.00017054456111509353
  Batch 11/18, Loss: 0.00019797400454990566
Epoch 1014/1500
  Batch 1/18, Loss: 0.0002558883570600301
  Batch 11/18, Loss: 0.0002754644665401429
Epoch 1015/1500
  Batch 1/18, Loss: 0.00017914654745254666
  Batch 11/18, Loss: 0.0003945277421735227
Epoch 1016/1500
  Batch 1/18, Loss: 0.0011033423943445086
  Batch 11/18, Loss: 0.00016307794430758804
Epoch 1017/1500
  Batch 1/18, Loss: 0.0005461653345264494
  Batch 11/18, Loss: 0.0003186596150044352
Epoch 1018/1500
```

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  Batch 1/18, Loss: 0.0005940088303759694
  Batch 11/18, Loss: 0.000176030007423833
Epoch 1019/1500
  Batch 1/18, Loss: 0.00017552744247950613
  Batch 11/18, Loss: 0.00016169939772225916
Epoch 1020/1500
  Batch 1/18, Loss: 0.0004283392336219549
  Batch 11/18, Loss: 0.0010510899592190908
Epoch 1021/1500
  Batch 1/18, Loss: 0.0001528913708170876
  Batch 11/18, Loss: 0.0002879947714973241
Epoch 1022/1500
  Batch 1/18, Loss: 0.00022556136536877602
  Batch 11/18, Loss: 0.0010168531443923712
Epoch 1023/1500
  Batch 1/18, Loss: 0.0002292513381689787
  Batch 11/18, Loss: 0.00051841139793396
Epoch 1024/1500
  Batch 1/18, Loss: 0.0006583323120139539
  Batch 11/18, Loss: 0.00020896561909466982
Epoch 1025/1500
  Batch 1/18, Loss: 0.0002136932744178921
  Batch 11/18, Loss: 0.00018468499183654785
Epoch 1026/1500
  Batch 1/18, Loss: 0.00030054859234951437
  Batch 11/18, Loss: 0.00023075658828020096
Epoch 1027/1500
  Batch 1/18, Loss: 0.00018077231652569026
  Batch 11/18, Loss: 0.0005957811372354627
Epoch 1028/1500
  Batch 1/18, Loss: 0.00032693298999220133
  Batch 11/18, Loss: 0.00018699864449445158
Epoch 1029/1500
  Batch 1/18, Loss: 0.00023002506350167096
  Batch 11/18, Loss: 0.0002811937010847032
Epoch 1030/1500
  Batch 1/18, Loss: 0.00014424268738366663
  Batch 11/18, Loss: 0.0003260901430621743
Epoch 1031/1500
  Batch 1/18, Loss: 0.00019192087347619236
  Batch 11/18, Loss: 0.0003033420362044126
Epoch 1032/1500
  Batch 1/18, Loss: 0.00018068731878884137
  Batch 11/18, Loss: 0.00022070381965022534
Epoch 1033/1500
  Batch 1/18, Loss: 0.0003795942757278681
  Batch 11/18, Loss: 0.00024371931795030832
Epoch 1034/1500
```

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  Batch 1/18, Loss: 0.0007085500983521342
  Batch 11/18, Loss: 0.00015753554180264473
Epoch 1035/1500
  Batch 1/18, Loss: 0.0001417751918779686
  Batch 11/18, Loss: 0.0001541240344522521
Epoch 1036/1500
  Batch 1/18, Loss: 0.00022488710237666965
  Batch 11/18, Loss: 0.00018574194109532982
Epoch 1037/1500
  Batch 1/18, Loss: 0.00022997874475549906
  Batch 11/18, Loss: 0.00025914330035448074
Epoch 1038/1500
  Batch 1/18, Loss: 0.0006395186064764857
  Batch 11/18, Loss: 0.0004523822572082281
Epoch 1039/1500
  Batch 1/18, Loss: 0.0010317444102838635
  Batch 11/18, Loss: 0.0004864496295340359
Epoch 1040/1500
  Batch 1/18, Loss: 0.00023870059521868825
  Batch 11/18, Loss: 0.00045046559534966946
Epoch 1041/1500
  Batch 1/18, Loss: 0.00020468510047066957
  Batch 11/18, Loss: 0.000129921521875076
Epoch 1042/1500
  Batch 1/18, Loss: 0.00024911819491535425
  Batch 11/18, Loss: 0.0012226557591930032
Epoch 1043/1500
  Batch 1/18, Loss: 0.00016038480680435896
  Batch 11/18, Loss: 0.00017362857761327177
Epoch 1044/1500
  Batch 1/18, Loss: 0.0002813375322148204
  Batch 11/18, Loss: 0.00014689331874251366
Epoch 1045/1500
  Batch 1/18, Loss: 0.0002214761625509709
  Batch 11/18, Loss: 0.00012014272942906246
Epoch 1046/1500
  Batch 1/18, Loss: 0.00027156597934663296
  Batch 11/18, Loss: 0.0001941265509231016
Epoch 1047/1500
  Batch 1/18, Loss: 0.0002627843932714313
  Batch 11/18, Loss: 0.0001552784233354032
Epoch 1048/1500
  Batch 1/18, Loss: 0.0005334556917659938
  Batch 11/18, Loss: 0.00015769494348205626
Epoch 1049/1500
  Batch 1/18, Loss: 0.00016862567281350493
  Batch 11/18, Loss: 0.0001754143595462665
Epoch 1050/1500
```

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  Batch 1/18, Loss: 0.00020014547044411302
  Batch 11/18, Loss: 0.00024380975810345262
Epoch 1051/1500
  Batch 1/18, Loss: 0.00019114831229671836
  Batch 11/18, Loss: 0.0004016607999801636
After epoch 1050, loss=0.00023092341143637896
Epoch 1052/1500
  Batch 1/18, Loss: 0.00021220358030404896
  Batch 11/18, Loss: 0.0005529970512725413
Epoch 1053/1500
  Batch 1/18, Loss: 0.00021656606986653306
  Batch 11/18, Loss: 0.0001744735345710069
Epoch 1054/1500
  Batch 1/18, Loss: 0.00015608796093147248
  Batch 11/18, Loss: 9.49126624618657e-05
Epoch 1055/1500
  Batch 1/18, Loss: 0.00028690259205177426
  Batch 11/18, Loss: 0.00024751704768277705
Epoch 1056/1500
  Batch 1/18, Loss: 0.00016262219287455082
  Batch 11/18, Loss: 0.0002651683462318033
Epoch 1057/1500
  Batch 1/18, Loss: 0.00014315378211904317
  Batch 11/18, Loss: 0.0002486561133991927
Epoch 1058/1500
  Batch 1/18, Loss: 0.00017746110097505152
  Batch 11/18, Loss: 0.00018817564705386758
Epoch 1059/1500
  Batch 1/18, Loss: 0.0002473514177836478
  Batch 11/18, Loss: 0.00013532811135519296
Epoch 1060/1500
  Batch 1/18, Loss: 0.0002699863398447633
  Batch 11/18, Loss: 0.00022790726507082582
Epoch 1061/1500
  Batch 1/18, Loss: 0.00014715456927660853
  Batch 11/18, Loss: 0.0003478672297205776
Epoch 1062/1500
  Batch 1/18, Loss: 0.0003123107017017901
  Batch 11/18, Loss: 0.00016695488011464477
Epoch 1063/1500
  Batch 1/18, Loss: 0.00022216641809791327
  Batch 11/18, Loss: 0.0002369171561440453
Epoch 1064/1500
  Batch 1/18, Loss: 0.00028162531089037657
  Batch 11/18, Loss: 0.0001603442807383835
Epoch 1065/1500
  Batch 1/18, Loss: 0.0002460976247675717
  Batch 11/18, Loss: 0.00019758376583922654
```

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Epoch 1066/1500
  Batch 1/18, Loss: 0.0010649472242221236
  Batch 11/18, Loss: 0.00019485893426463008
Epoch 1067/1500
  Batch 1/18, Loss: 0.0001478175981901586
  Batch 11/18, Loss: 0.0002228652301710099
Epoch 1068/1500
  Batch 1/18, Loss: 0.00036239487235434353
  Batch 11/18, Loss: 0.00018395864753983915
Epoch 1069/1500
  Batch 1/18, Loss: 0.0002810480073094368
  Batch 11/18, Loss: 0.00026019502547569573
Epoch 1070/1500
  Batch 1/18, Loss: 0.00018583879864308983
  Batch 11/18, Loss: 0.00020954720093868673
Epoch 1071/1500
  Batch 1/18, Loss: 0.0001685499883024022
  Batch 11/18, Loss: 0.0002453201450407505
Epoch 1072/1500
  Batch 1/18, Loss: 0.00010428031237097457
  Batch 11/18, Loss: 0.00020344441873021424
Epoch 1073/1500
  Batch 1/18, Loss: 0.00017801958892960101
  Batch 11/18, Loss: 0.0011518721003085375
Epoch 1074/1500
  Batch 1/18, Loss: 0.00017690511159499213
  Batch 11/18, Loss: 0.00029500643722712994
Epoch 1075/1500
  Batch 1/18, Loss: 0.00042978470446541905
  Batch 11/18, Loss: 0.00022343630553223193
Epoch 1076/1500
  Batch 1/18, Loss: 0.0001767197099979967
  Batch 11/18, Loss: 0.00016298811533488333
Epoch 1077/1500
  Batch 1/18, Loss: 0.00020437042985577136
  Batch 11/18, Loss: 0.000605225446633994
Epoch 1078/1500
  Batch 1/18, Loss: 0.00031984408269636333
  Batch 11/18, Loss: 0.0001907033147290349
Epoch 1079/1500
  Batch 1/18, Loss: 0.00018922255549114197
  Batch 11/18, Loss: 0.0001936203334480524
Epoch 1080/1500
  Batch 1/18, Loss: 0.00020009887521155179
  Batch 11/18, Loss: 0.0002076647651847452
Epoch 1081/1500
  Batch 1/18, Loss: 0.00015617295866832137
  Batch 11/18, Loss: 0.00016762546147219837
```

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Epoch 1082/1500
  Batch 1/18, Loss: 0.00010995475167874247
  Batch 11/18, Loss: 0.001013310975395143
Epoch 1083/1500
  Batch 1/18, Loss: 0.0003207215340808034
  Batch 11/18, Loss: 0.00022684487339574844
Epoch 1084/1500
  Batch 1/18, Loss: 0.0003576048475224525
  Batch 11/18, Loss: 0.000577012135181576
Epoch 1085/1500
  Batch 1/18, Loss: 0.00019076556782238185
  Batch 11/18, Loss: 0.0002250230754725635
Epoch 1086/1500
  Batch 1/18, Loss: 8.853984763845801e-05
  Batch 11/18, Loss: 0.0001793422270566225
Epoch 1087/1500
  Batch 1/18, Loss: 0.0002593881217762828
  Batch 11/18, Loss: 0.000131976354168728
Epoch 1088/1500
  Batch 1/18, Loss: 0.00041190217598341405
  Batch 11/18, Loss: 0.00016783812316134572
Epoch 1089/1500
  Batch 1/18, Loss: 0.00018583718338049948
  Batch 11/18, Loss: 0.00038195098750293255
Epoch 1090/1500
  Batch 1/18, Loss: 0.00036953826202079654
  Batch 11/18, Loss: 0.0005494950455613434
Epoch 1091/1500
  Batch 1/18, Loss: 0.00017213371756952256
  Batch 11/18, Loss: 9.757620136952028e-05
Epoch 1092/1500
  Batch 1/18, Loss: 0.00027805863646790385
  Batch 11/18, Loss: 0.00017485269927419722
Epoch 1093/1500
  Batch 1/18, Loss: 0.00022621038078796118
  Batch 11/18, Loss: 0.00017068856686819345
Epoch 1094/1500
  Batch 1/18, Loss: 0.0002928570902440697
  Batch 11/18, Loss: 0.0006140829063951969
Epoch 1095/1500
  Batch 1/18, Loss: 0.00032680522417649627
  Batch 11/18, Loss: 0.0002486271841917187
Epoch 1096/1500
  Batch 1/18, Loss: 0.00041439803317189217
  Batch 11/18, Loss: 0.0001650111807975918
Epoch 1097/1500
  Batch 1/18, Loss: 0.0002021725376835093
  Batch 11/18, Loss: 0.00019707840692717582
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Epoch 1098/1500
  Batch 1/18, Loss: 0.0011378834024071693
  Batch 11/18, Loss: 0.0002471523475833237
Epoch 1099/1500
  Batch 1/18, Loss: 0.0003488178481347859
  Batch 11/18, Loss: 0.00020215414406266063
Epoch 1100/1500
  Batch 1/18, Loss: 0.0001845141960075125
  Batch 11/18, Loss: 0.0005175267579033971
Epoch 1101/1500
  Batch 1/18, Loss: 0.0005610027001239359
  Batch 11/18, Loss: 0.0002679136232472956
After epoch 1100, loss=0.00017196510452777147
Epoch 1102/1500
  Batch 1/18, Loss: 0.00022731402714271098
  Batch 11/18, Loss: 0.0003264347615186125
Epoch 1103/1500
  Batch 1/18, Loss: 0.0009667786653153598
  Batch 11/18, Loss: 0.00022210765746422112
Epoch 1104/1500
  Batch 1/18, Loss: 0.00015518293366767466
  Batch 11/18, Loss: 0.00010108276910614222
Epoch 1105/1500
  Batch 1/18, Loss: 0.00010604823910398409
  Batch 11/18, Loss: 0.00017913735064212233
Epoch 1106/1500
  Batch 1/18, Loss: 0.00019781495211164596
  Batch 11/18, Loss: 0.00017010046576615423
Epoch 1107/1500
  Batch 1/18, Loss: 0.00016487861284986138
  Batch 11/18, Loss: 0.00018465948232915252
Epoch 1108/1500
  Batch 1/18, Loss: 0.000267951691057533
  Batch 11/18, Loss: 0.00018536689458414912
Epoch 1109/1500
  Batch 1/18, Loss: 0.00027757114730775356
  Batch 11/18, Loss: 0.00034113635774701834
Epoch 1110/1500
  Batch 1/18, Loss: 0.00014887108409311622
  Batch 11/18, Loss: 0.00015093301772139966
Epoch 1111/1500
  Batch 1/18, Loss: 0.0001622391282580793
  Batch 11/18, Loss: 0.00030772050376981497
Epoch 1112/1500
  Batch 1/18, Loss: 0.00015277575585059822
  Batch 11/18, Loss: 0.0002981793077196926
Epoch 1113/1500
  Batch 1/18, Loss: 0.00015228039410430938
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  Batch 11/18, Loss: 0.0002040885592577979
Epoch 1114/1500
  Batch 1/18, Loss: 0.0002115484094247222
  Batch 11/18, Loss: 0.00024800069513730705
Epoch 1115/1500
  Batch 1/18, Loss: 0.0010031190467998385
  Batch 11/18, Loss: 0.00018915570399258286
Epoch 1116/1500
  Batch 1/18, Loss: 0.0002496361266821623
  Batch 11/18, Loss: 0.00021962237951811403
Epoch 1117/1500
  Batch 1/18, Loss: 0.00020385818788781762
  Batch 11/18, Loss: 0.0002328763366676867
Epoch 1118/1500
  Batch 1/18, Loss: 0.00025151416775770485
  Batch 11/18, Loss: 0.00016816455172374845
Epoch 1119/1500
  Batch 1/18, Loss: 0.00017333401774521917
  Batch 11/18, Loss: 0.00016867357771843672
Epoch 1120/1500
  Batch 1/18, Loss: 0.00019514697487466037
  Batch 11/18, Loss: 0.00023594460799358785
Epoch 1121/1500
  Batch 1/18, Loss: 0.0001102673340938054
  Batch 11/18, Loss: 0.00027644014335237443
Epoch 1122/1500
  Batch 1/18, Loss: 0.00010393813136033714
  Batch 11/18, Loss: 0.00022622103278990835
Epoch 1123/1500
  Batch 1/18, Loss: 0.00018819714023265988
  Batch 11/18, Loss: 0.0010239408584311604
Epoch 1124/1500
  Batch 1/18, Loss: 0.0003836718969978392
  Batch 11/18, Loss: 0.0006567143718712032
Epoch 1125/1500
  Batch 1/18, Loss: 0.0002349468704778701
  Batch 11/18, Loss: 0.00017330635455437005
Epoch 1126/1500
  Batch 1/18, Loss: 0.0001770631060935557
  Batch 11/18, Loss: 9.744286944624037e-05
Epoch 1127/1500
  Batch 1/18, Loss: 0.00018711929442360997
  Batch 11/18, Loss: 0.00016896385932341218
Epoch 1128/1500
  Batch 1/18, Loss: 0.00035104615380987525
  Batch 11/18, Loss: 0.0005126865580677986
Epoch 1129/1500
  Batch 1/18, Loss: 0.00014398059283848852
```

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  Batch 11/18, Loss: 0.00038229304482229054
Epoch 1130/1500
  Batch 1/18, Loss: 0.00022532315051648766
  Batch 11/18, Loss: 0.00034889893140643835
Epoch 1131/1500
  Batch 1/18, Loss: 0.0006604550871998072
  Batch 11/18, Loss: 0.00013446407683659345
Epoch 1132/1500
  Batch 1/18, Loss: 0.0002544680901337415
  Batch 11/18, Loss: 0.00010933592420769855
Epoch 1133/1500
  Batch 1/18, Loss: 0.0001701817091088742
  Batch 11/18, Loss: 0.00020613110973499715
Epoch 1134/1500
  Batch 1/18, Loss: 0.0001239666889887303
  Batch 11/18, Loss: 0.00021221824863459915
Epoch 1135/1500
  Batch 1/18, Loss: 0.00016933056758716702
  Batch 11/18, Loss: 0.0005068028694950044
Epoch 1136/1500
  Batch 1/18, Loss: 0.0001566606224514544
  Batch 11/18, Loss: 0.00020117987878620625
Epoch 1137/1500
  Batch 1/18, Loss: 0.00020258335280232131
  Batch 11/18, Loss: 0.00013342982856556773
Epoch 1138/1500
  Batch 1/18, Loss: 0.00019381713354960084
  Batch 11/18, Loss: 0.00018266707775183022
Epoch 1139/1500
  Batch 1/18, Loss: 0.00017498912347946316
  Batch 11/18, Loss: 0.00015850228373892605
Epoch 1140/1500
  Batch 1/18, Loss: 0.00018696949700824916
  Batch 11/18, Loss: 0.00021950564405415207
Epoch 1141/1500
  Batch 1/18, Loss: 0.00021998831653036177
  Batch 11/18, Loss: 0.00015370459004770964
Epoch 1142/1500
  Batch 1/18, Loss: 0.0002559694112278521
  Batch 11/18, Loss: 0.00024320643569808453
Epoch 1143/1500
  Batch 1/18, Loss: 0.00019853151752613485
  Batch 11/18, Loss: 0.00023406384570989758
Epoch 1144/1500
  Batch 1/18, Loss: 0.0010200784308835864
  Batch 11/18, Loss: 0.00024026300525292754
Epoch 1145/1500
  Batch 1/18, Loss: 0.00017858408682513982
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  Batch 11/18, Loss: 0.0009885999606922269
Epoch 1146/1500
  Batch 1/18, Loss: 0.00013604448758997023
  Batch 11/18, Loss: 0.0002370182191953063
Epoch 1147/1500
  Batch 1/18, Loss: 0.000275200029136613
  Batch 11/18, Loss: 0.00011988937330897897
Epoch 1148/1500
  Batch 1/18, Loss: 0.0002073326031677425
  Batch 11/18, Loss: 0.00022058346075937152
Epoch 1149/1500
  Batch 1/18, Loss: 0.00019781924493145198
  Batch 11/18, Loss: 0.00016375961422454566
Epoch 1150/1500
  Batch 1/18, Loss: 0.0002283188223373145
  Batch 11/18, Loss: 0.00021450550411827862
Epoch 1151/1500
  Batch 1/18, Loss: 0.00014597672270610929
  Batch 11/18, Loss: 0.00029299009474925697
After epoch 1150, loss=0.00019462723867036402
Epoch 1152/1500
  Batch 1/18, Loss: 0.0003035152330994606
  Batch 11/18, Loss: 0.00019195422646589577
Epoch 1153/1500
  Batch 1/18, Loss: 0.00010571273742243648
  Batch 11/18, Loss: 0.00025570546858944
Epoch 1154/1500
  Batch 1/18, Loss: 0.00025439474848099053
  Batch 11/18, Loss: 0.0005319832707755268
Epoch 1155/1500
  Batch 1/18, Loss: 0.00015108240768313408
  Batch 11/18, Loss: 0.00016254445654340088
Epoch 1156/1500
  Batch 1/18, Loss: 0.0003830223868135363
  Batch 11/18, Loss: 0.0002504017611499876
Epoch 1157/1500
  Batch 1/18, Loss: 0.00018738173821475357
  Batch 11/18, Loss: 0.00015717692440375686
Epoch 1158/1500
  Batch 1/18, Loss: 0.0002440492680761963
  Batch 11/18, Loss: 0.00020188071357551962
Epoch 1159/1500
  Batch 1/18, Loss: 0.00027702582883648574
  Batch 11/18, Loss: 0.0002650572278071195
Epoch 1160/1500
  Batch 1/18, Loss: 0.00028763822047039866
  Batch 11/18, Loss: 0.00024701416259631515
Epoch 1161/1500
```

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  Batch 1/18, Loss: 0.00022745403111191231
  Batch 11/18, Loss: 0.00012727196735795587
Epoch 1162/1500
  Batch 1/18, Loss: 0.00021276647748891264
  Batch 11/18, Loss: 0.00016357221466023475
Epoch 1163/1500
  Batch 1/18, Loss: 0.0001527797430753708
  Batch 11/18, Loss: 0.0001541909878142178
Epoch 1164/1500
  Batch 1/18, Loss: 0.00017945069703273475
  Batch 11/18, Loss: 0.00039481394924223423
Epoch 1165/1500
  Batch 1/18, Loss: 0.00027076550759375095
  Batch 11/18, Loss: 0.00011594289389904588
Epoch 1166/1500
  Batch 1/18, Loss: 0.00021938388817943633
  Batch 11/18, Loss: 0.0001897510956041515
Epoch 1167/1500
  Batch 1/18, Loss: 0.0004994848859496415
  Batch 11/18, Loss: 0.00013846237561665475
Epoch 1168/1500
  Batch 1/18, Loss: 0.00026840573991648853
  Batch 11/18, Loss: 0.001309460960328579
Epoch 1169/1500
  Batch 1/18, Loss: 0.00026340378099121153
  Batch 11/18, Loss: 0.0004315648984629661
Epoch 1170/1500
  Batch 1/18, Loss: 0.0002536572574172169
  Batch 11/18, Loss: 0.00023340602638199925
Epoch 1171/1500
  Batch 1/18, Loss: 0.00018214060401078314
  Batch 11/18, Loss: 0.00014793479931540787
Epoch 1172/1500
  Batch 1/18, Loss: 0.00017277916776947677
  Batch 11/18, Loss: 0.00011361845827195793
Epoch 1173/1500
  Batch 1/18, Loss: 0.00037172314478084445
  Batch 11/18, Loss: 0.000159417322720401
Epoch 1174/1500
  Batch 1/18, Loss: 0.0002272443671245128
  Batch 11/18, Loss: 0.00025792454835027456
Epoch 1175/1500
  Batch 1/18, Loss: 0.00028847242356278
  Batch 11/18, Loss: 0.0006282121757976711
Epoch 1176/1500
  Batch 1/18, Loss: 0.0005138562992215157
  Batch 11/18, Loss: 0.0002855202183127403
Epoch 1177/1500
```

```
  Batch 1/18, Loss: 0.00016741947911214083
  Batch 11/18, Loss: 0.0002133203379344195
Epoch 1178/1500
  Batch 1/18, Loss: 0.0001445405650883913
  Batch 11/18, Loss: 0.0006114568677730858
Epoch 1179/1500
  Batch 1/18, Loss: 0.0002711995621211827
  Batch 11/18, Loss: 0.0002184649056289345
Epoch 1180/1500
  Batch 1/18, Loss: 0.00025702762650325894
  Batch 11/18, Loss: 0.00020002374367322773
Epoch 1181/1500
  Batch 1/18, Loss: 0.00021217700850684196
  Batch 11/18, Loss: 0.00020706352370325476
Epoch 1182/1500
  Batch 1/18, Loss: 0.001129184034653008
  Batch 11/18, Loss: 0.0006025995826348662
Epoch 1183/1500
  Batch 1/18, Loss: 0.0002673638518899679
  Batch 11/18, Loss: 0.00020230239897500724
Epoch 1184/1500
  Batch 1/18, Loss: 0.00044143630657345057
  Batch 11/18, Loss: 0.0002561042783781886
Epoch 1185/1500
  Batch 1/18, Loss: 0.0004699058481492102
  Batch 11/18, Loss: 0.00019998630159534514
Epoch 1186/1500
  Batch 1/18, Loss: 0.00016629010497126728
  Batch 11/18, Loss: 0.001019857358187437
Epoch 1187/1500
  Batch 1/18, Loss: 0.00019013468408957124
  Batch 11/18, Loss: 0.00020053706248290837
Epoch 1188/1500
  Batch 1/18, Loss: 0.0001959640794666484
  Batch 11/18, Loss: 0.00026981657720170915
Epoch 1189/1500
  Batch 1/18, Loss: 0.0003125497023575008
  Batch 11/18, Loss: 0.00022630981402471662
Epoch 1190/1500
  Batch 1/18, Loss: 0.0002687634259928018
  Batch 11/18, Loss: 0.0001323309406870976
Epoch 1191/1500
  Batch 1/18, Loss: 0.0006090382812544703
  Batch 11/18, Loss: 0.00026851316215470433
Epoch 1192/1500
  Batch 1/18, Loss: 0.00019475238514132798
  Batch 11/18, Loss: 0.000352167000528425
Epoch 1193/1500
```

```
  Batch 1/18, Loss: 0.00038483712705783546
  Batch 11/18, Loss: 0.00018699221254792064
Epoch 1194/1500
  Batch 1/18, Loss: 0.00042004886199720204
  Batch 11/18, Loss: 0.0010428421664983034
Epoch 1195/1500
  Batch 1/18, Loss: 0.00042808958096429706
  Batch 11/18, Loss: 0.0001504050160292536
Epoch 1196/1500
  Batch 1/18, Loss: 0.0001254527160199359
  Batch 11/18, Loss: 0.00020846756524406374
Epoch 1197/1500
  Batch 1/18, Loss: 0.0002194069093093276
  Batch 11/18, Loss: 0.00018148819799534976
Epoch 1198/1500
  Batch 1/18, Loss: 0.0001212645584018901
  Batch 11/18, Loss: 0.00046105135697871447
Epoch 1199/1500
  Batch 1/18, Loss: 0.00014452924369834363
  Batch 11/18, Loss: 0.00016429033712483943
Epoch 1200/1500
  Batch 1/18, Loss: 0.00015321699902415276
  Batch 11/18, Loss: 0.0002467842714395374
Epoch 1201/1500
  Batch 1/18, Loss: 0.00019849410455208272
  Batch 11/18, Loss: 0.00020667021453846246
After epoch 1200, loss=8.337031613336876e-05
Epoch 1202/1500
  Batch 1/18, Loss: 0.00025088575785048306
  Batch 11/18, Loss: 0.00012617080938071012
Epoch 1203/1500
  Batch 1/18, Loss: 0.00021333676704671234
  Batch 11/18, Loss: 0.00018257187912240624
Epoch 1204/1500
  Batch 1/18, Loss: 0.00019264082948211158
  Batch 11/18, Loss: 0.00014904614363331348
Epoch 1205/1500
  Batch 1/18, Loss: 0.00045322722871787846
  Batch 11/18, Loss: 0.00015942232857923955
Epoch 1206/1500
  Batch 1/18, Loss: 0.00031929585384204984
  Batch 11/18, Loss: 0.001009231200441718
Epoch 1207/1500
  Batch 1/18, Loss: 0.00018254821770824492
  Batch 11/18, Loss: 0.0003999861655756831
Epoch 1208/1500
  Batch 1/18, Loss: 0.00023920947569422424
  Batch 11/18, Loss: 0.00018774261116050184
```

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Epoch 1209/1500
  Batch 1/18, Loss: 0.00012509713997133076
  Batch 11/18, Loss: 0.00014598536654375494
Epoch 1210/1500
  Batch 1/18, Loss: 0.0001654399384278804
  Batch 11/18, Loss: 0.0009329752065241337
Epoch 1211/1500
  Batch 1/18, Loss: 0.00016538093041162938
  Batch 11/18, Loss: 0.0005273482529446483
Epoch 1212/1500
  Batch 1/18, Loss: 0.00034051353577524424
  Batch 11/18, Loss: 0.0009647679980844259
Epoch 1213/1500
  Batch 1/18, Loss: 0.00018090644152835011
  Batch 11/18, Loss: 0.00024536915589123964
Epoch 1214/1500
  Batch 1/18, Loss: 0.00054289645049721
  Batch 11/18, Loss: 0.0009285798878408968
Epoch 1215/1500
  Batch 1/18, Loss: 0.00018457032274454832
  Batch 11/18, Loss: 0.00017983184079639614
Epoch 1216/1500
  Batch 1/18, Loss: 0.00021857998217456043
  Batch 11/18, Loss: 0.0009801271371543407
Epoch 1217/1500
  Batch 1/18, Loss: 0.00013559963554143906
  Batch 11/18, Loss: 0.00014786591054871678
Epoch 1218/1500
  Batch 1/18, Loss: 0.00019461510237306356
  Batch 11/18, Loss: 0.00012741563841700554
Epoch 1219/1500
  Batch 1/18, Loss: 0.0002124373713741079
  Batch 11/18, Loss: 0.0001955171610461548
Epoch 1220/1500
  Batch 1/18, Loss: 0.00014293185085989535
  Batch 11/18, Loss: 0.00016234992654062808
Epoch 1221/1500
  Batch 1/18, Loss: 0.00018109405937138945
  Batch 11/18, Loss: 0.00024432409554719925
Epoch 1222/1500
  Batch 1/18, Loss: 0.0001871524436865002
  Batch 11/18, Loss: 0.00040019486914388835
Epoch 1223/1500
  Batch 1/18, Loss: 0.0001585739228175953
  Batch 11/18, Loss: 0.0002225739590357989
Epoch 1224/1500
  Batch 1/18, Loss: 0.00028620593366213143
  Batch 11/18, Loss: 0.00030603416962549094
```

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Epoch 1225/1500
  Batch 1/18, Loss: 0.0001851526612881571
  Batch 11/18, Loss: 0.00021432660287246108
Epoch 1226/1500
  Batch 1/18, Loss: 0.0001059723217622377
  Batch 11/18, Loss: 0.00026495009660720825
Epoch 1227/1500
  Batch 1/18, Loss: 0.0002989459899254143
  Batch 11/18, Loss: 0.0009002351434901357
Epoch 1228/1500
  Batch 1/18, Loss: 0.0001462325599277392
  Batch 11/18, Loss: 0.0003155393060296774
Epoch 1229/1500
  Batch 1/18, Loss: 0.0008991328068077564
  Batch 11/18, Loss: 0.00021012952493038028
Epoch 1230/1500
  Batch 1/18, Loss: 0.00016346917254850268
  Batch 11/18, Loss: 0.00022854734561406076
Epoch 1231/1500
  Batch 1/18, Loss: 0.00019894125580321997
  Batch 11/18, Loss: 0.00032383925281465054
Epoch 1232/1500
  Batch 1/18, Loss: 0.00021739961812272668
  Batch 11/18, Loss: 0.00019885043730027974
Epoch 1233/1500
  Batch 1/18, Loss: 0.001008197432383895
  Batch 11/18, Loss: 0.00019274852820672095
Epoch 1234/1500
  Batch 1/18, Loss: 0.00021954152907710522
  Batch 11/18, Loss: 0.0002019009116338566
Epoch 1235/1500
  Batch 1/18, Loss: 0.00024579899036325514
  Batch 11/18, Loss: 0.00021392323833424598
Epoch 1236/1500
  Batch 1/18, Loss: 0.00017984201258514076
  Batch 11/18, Loss: 0.0001589255261933431
Epoch 1237/1500
  Batch 1/18, Loss: 0.00017134923837147653
  Batch 11/18, Loss: 0.00031276990193873644
Epoch 1238/1500
  Batch 1/18, Loss: 0.00020004980615340173
  Batch 11/18, Loss: 0.00018106354400515556
Epoch 1239/1500
  Batch 1/18, Loss: 0.0002973504888359457
  Batch 11/18, Loss: 0.00017125815793406218
Epoch 1240/1500
  Batch 1/18, Loss: 0.000255538965575397
  Batch 11/18, Loss: 0.0002855706843547523
```

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Epoch 1241/1500
  Batch 1/18, Loss: 0.0001855084701674059
  Batch 11/18, Loss: 0.00019266885647084564
Epoch 1242/1500
  Batch 1/18, Loss: 0.00012312029139138758
  Batch 11/18, Loss: 0.00017956622468773276
Epoch 1243/1500
  Batch 1/18, Loss: 0.00014512758934870362
  Batch 11/18, Loss: 0.00022236717632040381
Epoch 1244/1500
  Batch 1/18, Loss: 0.0002330216084374115
  Batch 11/18, Loss: 0.0009764013811945915
Epoch 1245/1500
  Batch 1/18, Loss: 0.0003306951839476824
  Batch 11/18, Loss: 0.0009144008508883417
Epoch 1246/1500
  Batch 1/18, Loss: 0.00017335536540485919
  Batch 11/18, Loss: 0.00014127632312010974
Epoch 1247/1500
  Batch 1/18, Loss: 0.0001982814574148506
  Batch 11/18, Loss: 0.00010488967382116243
Epoch 1248/1500
  Batch 1/18, Loss: 0.0003020645526703447
  Batch 11/18, Loss: 0.00014901012764312327
Epoch 1249/1500
  Batch 1/18, Loss: 0.0006153347785584629
  Batch 11/18, Loss: 0.0010003347415477037
Epoch 1250/1500
  Batch 1/18, Loss: 0.00019269998301751912
  Batch 11/18, Loss: 0.00013590266462415457
Epoch 1251/1500
  Batch 1/18, Loss: 0.0001220948324771598
  Batch 11/18, Loss: 0.00020770540868397802
After epoch 1250, loss=0.0002305925008840859
Epoch 1252/1500
  Batch 1/18, Loss: 0.0002017666702158749
  Batch 11/18, Loss: 0.0001640222908463329
Epoch 1253/1500
  Batch 1/18, Loss: 0.00016257310926448554
  Batch 11/18, Loss: 0.00024406456213910133
Epoch 1254/1500
  Batch 1/18, Loss: 9.577568562235683e-05
  Batch 11/18, Loss: 0.00027579613379202783
Epoch 1255/1500
  Batch 1/18, Loss: 0.0005143255693838
  Batch 11/18, Loss: 0.00025363388704136014
Epoch 1256/1500
  Batch 1/18, Loss: 0.00026028373395092785
```

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  Batch 11/18, Loss: 0.0002409605513093993
Epoch 1257/1500
  Batch 1/18, Loss: 0.0006311510223895311
  Batch 11/18, Loss: 0.0002380181394983083
Epoch 1258/1500
  Batch 1/18, Loss: 0.00019010760297533125
  Batch 11/18, Loss: 0.00013158952060621232
Epoch 1259/1500
  Batch 1/18, Loss: 0.00014094988000579178
  Batch 11/18, Loss: 0.000934225448872894
Epoch 1260/1500
  Batch 1/18, Loss: 0.00021893838129471987
  Batch 11/18, Loss: 0.0002880171814467758
Epoch 1261/1500
  Batch 1/18, Loss: 0.0002180573355872184
  Batch 11/18, Loss: 0.00013555804616771638
Epoch 1262/1500
  Batch 1/18, Loss: 0.0001601964613655582
  Batch 11/18, Loss: 0.0005318883340805769
Epoch 1263/1500
  Batch 1/18, Loss: 0.000159557064762339
  Batch 11/18, Loss: 0.0001754637050908059
Epoch 1264/1500
  Batch 1/18, Loss: 0.00013637221127282828
  Batch 11/18, Loss: 0.00020651319937314838
Epoch 1265/1500
  Batch 1/18, Loss: 0.00018299797375220805
  Batch 11/18, Loss: 0.00019132472516503185
Epoch 1266/1500
  Batch 1/18, Loss: 0.00016276221140287817
  Batch 11/18, Loss: 0.00020714200218208134
Epoch 1267/1500
  Batch 1/18, Loss: 0.00019949357374571264
  Batch 11/18, Loss: 0.00019752580556087196
Epoch 1268/1500
  Batch 1/18, Loss: 0.00043486879440024495
  Batch 11/18, Loss: 0.0005729738040827215
Epoch 1269/1500
  Batch 1/18, Loss: 0.001222470193170011
  Batch 11/18, Loss: 0.0002537855471018702
Epoch 1270/1500
  Batch 1/18, Loss: 0.00013214391947258264
  Batch 11/18, Loss: 0.00014056464715395123
Epoch 1271/1500
  Batch 1/18, Loss: 0.00018986348004546016
  Batch 11/18, Loss: 0.00018166657537221909
Epoch 1272/1500
  Batch 1/18, Loss: 0.0003375896194484085
```

```
  Batch 11/18, Loss: 0.00020046584540978074
Epoch 1273/1500
  Batch 1/18, Loss: 0.00016245753795374185
  Batch 11/18, Loss: 0.0003770690527744591
Epoch 1274/1500
  Batch 1/18, Loss: 0.00012105744099244475
  Batch 11/18, Loss: 0.00017387628031428903
Epoch 1275/1500
  Batch 1/18, Loss: 0.00012495963892433792
  Batch 11/18, Loss: 0.00019375933334231377
Epoch 1276/1500
  Batch 1/18, Loss: 0.00021921911684330553
  Batch 11/18, Loss: 0.0005395025364123285
Epoch 1277/1500
  Batch 1/18, Loss: 0.00033139693550765514
  Batch 11/18, Loss: 0.00025716228992678225
Epoch 1278/1500
  Batch 1/18, Loss: 0.00022716647072229534
  Batch 11/18, Loss: 0.0003935214481316507
Epoch 1279/1500
  Batch 1/18, Loss: 0.00015901950246618879
  Batch 11/18, Loss: 0.00022511380666401237
Epoch 1280/1500
  Batch 1/18, Loss: 0.00021285799448378384
  Batch 11/18, Loss: 0.00017795010353438556
Epoch 1281/1500
  Batch 1/18, Loss: 0.00013234646758064628
  Batch 11/18, Loss: 0.000220341986278072
Epoch 1282/1500
  Batch 1/18, Loss: 0.00016954040620476007
  Batch 11/18, Loss: 0.0010001915507018566
Epoch 1283/1500
  Batch 1/18, Loss: 0.00012110544776078314
  Batch 11/18, Loss: 0.00018384221766609699
Epoch 1284/1500
  Batch 1/18, Loss: 0.0001415839942637831
  Batch 11/18, Loss: 0.0003535544383339584
Epoch 1285/1500
  Batch 1/18, Loss: 0.0003924492630176246
  Batch 11/18, Loss: 0.00014917811495251954
Epoch 1286/1500
  Batch 1/18, Loss: 0.0009517612634226 68
  Batch 11/18, Loss: 0.00013974984176456928
Epoch 1287/1500
  Batch 1/18, Loss: 0.00019171358144376427
  Batch 11/18, Loss: 0.00027679253253154457
Epoch 1288/1500
  Batch 1/18, Loss: 0.00036688765976577997
```

```
  Batch 11/18, Loss: 0.0009712260216474533
Epoch 1289/1500
  Batch 1/18, Loss: 0.00023032301396597177
  Batch 11/18, Loss: 0.00014503243437502533
Epoch 1290/1500
  Batch 1/18, Loss: 0.0003385018208064139
  Batch 11/18, Loss: 0.00017673637194093317
Epoch 1291/1500
  Batch 1/18, Loss: 0.00022616797650698572
  Batch 11/18, Loss: 0.0001580521056894213
Epoch 1292/1500
  Batch 1/18, Loss: 0.00016614091873634607
  Batch 11/18, Loss: 0.0001825080398702994
Epoch 1293/1500
  Batch 1/18, Loss: 0.0002177468268200755
  Batch 11/18, Loss: 0.00022022967459633946
Epoch 1294/1500
  Batch 1/18, Loss: 0.00020995328668504953
  Batch 11/18, Loss: 0.00011434640327934176
Epoch 1295/1500
  Batch 1/18, Loss: 0.0002678032615222037
  Batch 11/18, Loss: 0.0001276407710975036
Epoch 1296/1500
  Batch 1/18, Loss: 0.00029516351060010493
  Batch 11/18, Loss: 0.00022071156126912683
Epoch 1297/1500
  Batch 1/18, Loss: 0.0003255701740272343
  Batch 11/18, Loss: 0.00023583961592521518
Epoch 1298/1500
  Batch 1/18, Loss: 0.0001655873202253133
  Batch 11/18, Loss: 0.00018748488218989223
Epoch 1299/1500
  Batch 1/18, Loss: 0.00017799317720346153
  Batch 11/18, Loss: 0.0001877776230685413
Epoch 1300/1500
  Batch 1/18, Loss: 0.0002236297877971083
  Batch 11/18, Loss: 0.000357980839908123
Epoch 1301/1500
  Batch 1/18, Loss: 0.0002871464821510017
  Batch 11/18, Loss: 0.00019521411741152406
After epoch 1300, loss=0.00028400286100804806
Epoch 1302/1500
  Batch 1/18, Loss: 0.00012829284241888672
  Batch 11/18, Loss: 0.0003322525881230831
Epoch 1303/1500
  Batch 1/18, Loss: 0.00020356975437607616
  Batch 11/18, Loss: 0.00017153561930172145
Epoch 1304/1500
```

```
  Batch 1/18, Loss: 0.0005564268212765455
  Batch 11/18, Loss: 0.00025696156080812216
Epoch 1305/1500
  Batch 1/18, Loss: 0.00017528998432680964
  Batch 11/18, Loss: 0.00047172378981485963
Epoch 1306/1500
  Batch 1/18, Loss: 0.0003884922480210662
  Batch 11/18, Loss: 0.00015161199553404003
Epoch 1307/1500
  Batch 1/18, Loss: 0.00015200377674773335
  Batch 11/18, Loss: 0.00020352532737888396
Epoch 1308/1500
  Batch 1/18, Loss: 0.0002494728541933
  Batch 11/18, Loss: 0.00020330736879259348
Epoch 1309/1500
  Batch 1/18, Loss: 0.00016207392036449164
  Batch 11/18, Loss: 0.00013440031034406275
Epoch 1310/1500
  Batch 1/18, Loss: 0.0003884400939568877
  Batch 11/18, Loss: 0.00010139050573343411
Epoch 1311/1500
  Batch 1/18, Loss: 0.00019051526032853872
  Batch 11/18, Loss: 0.0003623698721639812
Epoch 1312/1500
  Batch 1/18, Loss: 0.0006355642690323293
  Batch 11/18, Loss: 0.0009224789682775736
Epoch 1313/1500
  Batch 1/18, Loss: 0.00019342546875122935
  Batch 11/18, Loss: 0.0009440802969038486
Epoch 1314/1500
  Batch 1/18, Loss: 0.00011131212522741407
  Batch 11/18, Loss: 0.00025541314971633255
Epoch 1315/1500
  Batch 1/18, Loss: 0.00023974159557837993
  Batch 11/18, Loss: 0.0003038003924302757
Epoch 1316/1500
  Batch 1/18, Loss: 0.0002598137070890516
  Batch 11/18, Loss: 0.00021732176537625492
Epoch 1317/1500
  Batch 1/18, Loss: 0.00029402386280708015
  Batch 11/18, Loss: 0.00017935298092197627
Epoch 1318/1500
  Batch 1/18, Loss: 0.0003266440180595964
  Batch 11/18, Loss: 0.0001835125731304288
Epoch 1319/1500
  Batch 1/18, Loss: 0.0001318091672146693
  Batch 11/18, Loss: 0.0002679213066585362
Epoch 1320/1500
```

```
  Batch 1/18, Loss: 0.0002518844557926059
  Batch 11/18, Loss: 0.00026724988128989935
Epoch 1321/1500
  Batch 1/18, Loss: 0.00014549448678735644
  Batch 11/18, Loss: 0.00026297540171071887
Epoch 1322/1500
  Batch 1/18, Loss: 0.00017821141227614135
  Batch 11/18, Loss: 0.0002398307842668146
Epoch 1323/1500
  Batch 1/18, Loss: 0.0001393535640090704
  Batch 11/18, Loss: 0.0001456152822356671
Epoch 1324/1500
  Batch 1/18, Loss: 0.00020720390602946281
  Batch 11/18, Loss: 0.000255159247899428
Epoch 1325/1500
  Batch 1/18, Loss: 0.0003050347731914371
  Batch 11/18, Loss: 0.0002623719337861985
Epoch 1326/1500
  Batch 1/18, Loss: 0.0012377495877444744
  Batch 11/18, Loss: 0.00014390969590749592
Epoch 1327/1500
  Batch 1/18, Loss: 0.0001446081296307966
  Batch 11/18, Loss: 0.000529440410900861
Epoch 1328/1500
  Batch 1/18, Loss: 0.0002097741380566731
  Batch 11/18, Loss: 0.00011224904301343486
Epoch 1329/1500
  Batch 1/18, Loss: 0.0001191186165669933
  Batch 11/18, Loss: 0.00028061697958037257
Epoch 1330/1500
  Batch 1/18, Loss: 0.00017629227659199387
  Batch 11/18, Loss: 0.0009263763204216957
Epoch 1331/1500
  Batch 1/18, Loss: 0.00018365761206950992
  Batch 11/18, Loss: 0.00012245579273439944
Epoch 1332/1500
  Batch 1/18, Loss: 0.0002833539037965238
  Batch 11/18, Loss: 0.0002699184697121382
Epoch 1333/1500
  Batch 1/18, Loss: 0.00012663970119319856
  Batch 11/18, Loss: 0.00022303350851871073
Epoch 1334/1500
  Batch 1/18, Loss: 0.0001712786906864494
  Batch 11/18, Loss: 0.00018605847435537726
Epoch 1335/1500
  Batch 1/18, Loss: 0.00014931459736544644
  Batch 11/18, Loss: 0.0001926767872646451
Epoch 1336/1500
```

```
  Batch 1/18, Loss: 0.000273536192253232
  Batch 11/18, Loss: 0.00017059074889402837
Epoch 1337/1500
  Batch 1/18, Loss: 0.00022648775484412909
  Batch 11/18, Loss: 0.00019016393343918025
Epoch 1338/1500
  Batch 1/18, Loss: 0.00012172776769148186
  Batch 11/18, Loss: 0.0002114968083333224
Epoch 1339/1500
  Batch 1/18, Loss: 0.0002450624306220561
  Batch 11/18, Loss: 0.00016821784083731472
Epoch 1340/1500
  Batch 1/18, Loss: 0.00021092736278660595
  Batch 11/18, Loss: 0.00024640889023430645
Epoch 1341/1500
  Batch 1/18, Loss: 0.0002570172364357859
  Batch 11/18, Loss: 0.00016585241246502846
Epoch 1342/1500
  Batch 1/18, Loss: 0.0002973327354993671
  Batch 11/18, Loss: 0.00019631945178844035
Epoch 1343/1500
  Batch 1/18, Loss: 0.0004203102726023644
  Batch 11/18, Loss: 0.0012534117558971047
Epoch 1344/1500
  Batch 1/18, Loss: 0.00025591737357899547
  Batch 11/18, Loss: 0.00043276301585137844
Epoch 1345/1500
  Batch 1/18, Loss: 0.0003055818669963628
  Batch 11/18, Loss: 0.0002046862500719726
Epoch 1346/1500
  Batch 1/18, Loss: 0.0008955635130405426
  Batch 11/18, Loss: 0.000215682084672153
Epoch 1347/1500
  Batch 1/18, Loss: 0.00015768699813634157
  Batch 11/18, Loss: 0.0005476043443195522
Epoch 1348/1500
  Batch 1/18, Loss: 0.0001805764331948012
  Batch 11/18, Loss: 0.00018980346794705838
Epoch 1349/1500
  Batch 1/18, Loss: 0.00041306455386802554
  Batch 11/18, Loss: 0.0002251383994007483
Epoch 1350/1500
  Batch 1/18, Loss: 0.00017446905258111656
  Batch 11/18, Loss: 0.00026598587282933295
Epoch 1351/1500
  Batch 1/18, Loss: 0.000250086683081463
  Batch 11/18, Loss: 0.00015319640806410462
After epoch 1350, loss=9.982843766920269e-05
```

```
Epoch 1352/1500
  Batch 1/18, Loss: 0.00021436254610307515
  Batch 11/18, Loss: 0.00018345146963838488
Epoch 1353/1500
  Batch 1/18, Loss: 0.0008948019240051508
  Batch 11/18, Loss: 0.00012583809439092875
Epoch 1354/1500
  Batch 1/18, Loss: 0.00024967343779280078
  Batch 11/18, Loss: 0.0009177852771244943
Epoch 1355/1500
  Batch 1/18, Loss: 0.00032632704824209213
  Batch 11/18, Loss: 0.00019019734463654459
Epoch 1356/1500
  Batch 1/18, Loss: 0.00022559618810191750
  Batch 11/18, Loss: 0.00043435883708298206
Epoch 1357/1500
  Batch 1/18, Loss: 0.00018070073565468192
  Batch 11/18, Loss: 0.0002220013557234779
Epoch 1358/1500
  Batch 1/18, Loss: 0.00018788530724123120
  Batch 11/18, Loss: 0.0009667111444287002
Epoch 1359/1500
  Batch 1/18, Loss: 0.00017803965602070093
  Batch 11/18, Loss: 0.0001415935403201729
Epoch 1360/1500
  Batch 1/18, Loss: 0.0002227731456514448
  Batch 11/18, Loss: 0.0001565148850204423
Epoch 1361/1500
  Batch 1/18, Loss: 0.0005222501931712031
  Batch 11/18, Loss: 0.0001915994507726282
Epoch 1362/1500
  Batch 1/18, Loss: 0.0001740268198773265
  Batch 11/18, Loss: 0.00019443467317614704
Epoch 1363/1500
  Batch 1/18, Loss: 0.0003293853660579771
  Batch 11/18, Loss: 0.00020093107013963163
Epoch 1364/1500
  Batch 1/18, Loss: 0.0001885182864498347
  Batch 11/18, Loss: 0.00014788866974413395
Epoch 1365/1500
  Batch 1/18, Loss: 0.0001355049025733024
  Batch 11/18, Loss: 0.0001711632066871971
Epoch 1366/1500
  Batch 1/18, Loss: 0.00015186582459136844
  Batch 11/18, Loss: 0.00025220023235306144
Epoch 1367/1500
  Batch 1/18, Loss: 0.00018676728359423578
  Batch 11/18, Loss: 0.00021433585789054632
```

```
Epoch 1368/1500
  Batch 1/18, Loss: 0.000270225660642609
  Batch 11/18, Loss: 0.00036161093157716095
Epoch 1369/1500
  Batch 1/18, Loss: 0.00027976924320682883
  Batch 11/18, Loss: 0.00023126642918214202
Epoch 1370/1500
  Batch 1/18, Loss: 0.0003955214924644679
  Batch 11/18, Loss: 0.0002643940388225019
Epoch 1371/1500
  Batch 1/18, Loss: 0.0002609309449326247
  Batch 11/18, Loss: 0.000257328589214012
Epoch 1372/1500
  Batch 1/18, Loss: 0.0001737660786602646
  Batch 11/18, Loss: 0.00015003840962890536
Epoch 1373/1500
  Batch 1/18, Loss: 0.00023544946452602744
  Batch 11/18, Loss: 0.00021693017333745956
Epoch 1374/1500
  Batch 1/18, Loss: 0.0004781861207447946
  Batch 11/18, Loss: 0.00017047731671482325
Epoch 1375/1500
  Batch 1/18, Loss: 0.00021958399156574116
  Batch 11/18, Loss: 0.00019811329548247159
Epoch 1376/1500
  Batch 1/18, Loss: 0.0005318651674315333
  Batch 11/18, Loss: 0.0008641118183732033
Epoch 1377/1500
  Batch 1/18, Loss: 0.000522057933267206
  Batch 11/18, Loss: 0.00018155538418795913
Epoch 1378/1500
  Batch 1/18, Loss: 0.00017690134700387716
  Batch 11/18, Loss: 0.0003659493522718549
Epoch 1379/1500
  Batch 1/18, Loss: 0.00044774331036023796
  Batch 11/18, Loss: 0.000204401119844988
Epoch 1380/1500
  Batch 1/18, Loss: 0.00024594919523224235
  Batch 11/18, Loss: 0.00015674278256483376
Epoch 1381/1500
  Batch 1/18, Loss: 0.00034133816370740533
  Batch 11/18, Loss: 0.00025897659361362457
Epoch 1382/1500
  Batch 1/18, Loss: 0.00014336442109197378
  Batch 11/18, Loss: 0.0003189720737282187
Epoch 1383/1500
  Batch 1/18, Loss: 0.00018072302918881178
  Batch 11/18, Loss: 0.00032711532549001276
```

```
Epoch 1384/1500
  Batch 1/18, Loss: 0.0006109679234214127
  Batch 11/18, Loss: 0.00013883579231332988
Epoch 1385/1500
  Batch 1/18, Loss: 0.00019915055599994957
  Batch 11/18, Loss: 0.00021982374892104417
Epoch 1386/1500
  Batch 1/18, Loss: 0.0003272168687544763
  Batch 11/18, Loss: 0.00011942594574065879
Epoch 1387/1500
  Batch 1/18, Loss: 0.00022991921287029982
  Batch 11/18, Loss: 0.00017534020298626274
Epoch 1388/1500
  Batch 1/18, Loss: 0.0005383007228374481
  Batch 11/18, Loss: 0.00019318863633088768
Epoch 1389/1500
  Batch 1/18, Loss: 0.00022704718867316842
  Batch 11/18, Loss: 0.00023529314785264432
Epoch 1390/1500
  Batch 1/18, Loss: 0.0002665050560608506
  Batch 11/18, Loss: 0.00015183402865659446
Epoch 1391/1500
  Batch 1/18, Loss: 0.0005958498222753406
  Batch 11/18, Loss: 0.00031961221247911453
Epoch 1392/1500
  Batch 1/18, Loss: 0.00010563297109911218
  Batch 11/18, Loss: 0.00017709124949760735
Epoch 1393/1500
  Batch 1/18, Loss: 0.0008453092304989696
  Batch 11/18, Loss: 0.00017820649372879416
Epoch 1394/1500
  Batch 1/18, Loss: 0.00016793615941423923
  Batch 11/18, Loss: 0.00014237745199352503
Epoch 1395/1500
  Batch 1/18, Loss: 0.00019458944734651595
  Batch 11/18, Loss: 0.00023570923076476902
Epoch 1396/1500
  Batch 1/18, Loss: 0.0003567324602045119
  Batch 11/18, Loss: 0.0004959428333677351
Epoch 1397/1500
  Batch 1/18, Loss: 0.00028062466299161315
  Batch 11/18, Loss: 0.00021603137429337949
Epoch 1398/1500
  Batch 1/18, Loss: 0.00044551683822646737
  Batch 11/18, Loss: 0.00015507875650655478
Epoch 1399/1500
  Batch 1/18, Loss: 0.00010822716285474598
  Batch 11/18, Loss: 0.0003123394853901118
```

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Epoch 1400/1500
  Batch 1/18, Loss: 0.0010438046883791685
  Batch 11/18, Loss: 0.00021623230713885278
Epoch 1401/1500
  Batch 1/18, Loss: 0.00029083952540531754
  Batch 11/18, Loss: 0.00036767430719919503
After epoch 1400, loss=0.0002508806064724922
Epoch 1402/1500
  Batch 1/18, Loss: 0.00021929977810941637
  Batch 11/18, Loss: 0.00020911870524287224
Epoch 1403/1500
  Batch 1/18, Loss: 0.00015883198648225516
  Batch 11/18, Loss: 9.418071567779407e-05
Epoch 1404/1500
  Batch 1/18, Loss: 0.00017667197971604764
  Batch 11/18, Loss: 0.00027405383298173547
Epoch 1405/1500
  Batch 1/18, Loss: 0.00023050798336043954
  Batch 11/18, Loss: 0.0002822191745508462
Epoch 1406/1500
  Batch 1/18, Loss: 0.00016239873366430402
  Batch 11/18, Loss: 0.00014479446690529585
Epoch 1407/1500
  Batch 1/18, Loss: 0.00023859521024860442
  Batch 11/18, Loss: 0.0008860771777108312
Epoch 1408/1500
  Batch 1/18, Loss: 0.0005713925929740071
  Batch 11/18, Loss: 0.00022465801157522947
Epoch 1409/1500
  Batch 1/18, Loss: 0.000820896471850574
  Batch 11/18, Loss: 0.0004148808366153389
Epoch 1410/1500
  Batch 1/18, Loss: 0.0002645571657922119
  Batch 11/18, Loss: 0.00020463857799768448
Epoch 1411/1500
  Batch 1/18, Loss: 0.0001506667904322967
  Batch 11/18, Loss: 0.00020979328837711364
Epoch 1412/1500
  Batch 1/18, Loss: 0.00020349422993604094
  Batch 11/18, Loss: 0.00024301027588080615
Epoch 1413/1500
  Batch 1/18, Loss: 0.00013866618974134326
  Batch 11/18, Loss: 0.0001879371702671051
Epoch 1414/1500
  Batch 1/18, Loss: 0.00021794487838633358
  Batch 11/18, Loss: 0.0002381862432230264
Epoch 1415/1500
  Batch 1/18, Loss: 0.0009149992256425321
```

```
  Batch 11/18, Loss: 0.00017342947830911726
Epoch 1416/1500
  Batch 1/18, Loss: 0.00016859314928296953
  Batch 11/18, Loss: 0.00017267045041080564
Epoch 1417/1500
  Batch 1/18, Loss: 0.0009562709601595998
  Batch 11/18, Loss: 0.00019709535990841687
Epoch 1418/1500
  Batch 1/18, Loss: 0.00032835479942150414
  Batch 11/18, Loss: 0.0002008935553021729
Epoch 1419/1500
  Batch 1/18, Loss: 0.00013990832667332143
  Batch 11/18, Loss: 0.0008785783429630101
Epoch 1420/1500
  Batch 1/18, Loss: 0.00018349150195717812
  Batch 11/18, Loss: 0.00014401739463210106
Epoch 1421/1500
  Batch 1/18, Loss: 0.00020499300444498658
  Batch 11/18, Loss: 0.00030044856248423457
Epoch 1422/1500
  Batch 1/18, Loss: 0.00022098749468568712
  Batch 11/18, Loss: 0.00021332668256945908
Epoch 1423/1500
  Batch 1/18, Loss: 0.00014201912563294172
  Batch 11/18, Loss: 0.00016336383123416454
Epoch 1424/1500
  Batch 1/18, Loss: 0.00020774555741809309
  Batch 11/18, Loss: 0.00020562540157698095
Epoch 1425/1500
  Batch 1/18, Loss: 0.00015492788224946707
  Batch 11/18, Loss: 0.00034590609720908105
Epoch 1426/1500
  Batch 1/18, Loss: 0.0005476833321154118
  Batch 11/18, Loss: 0.0002845098788384348
Epoch 1427/1500
  Batch 1/18, Loss: 0.00034936677548103034
  Batch 11/18, Loss: 0.000491073296871010363
Epoch 1428/1500
  Batch 1/18, Loss: 0.00010906546231126413
  Batch 11/18, Loss: 0.00024232699070125818
Epoch 1429/1500
  Batch 1/18, Loss: 0.0001902352669276297
  Batch 11/18, Loss: 0.00014901300892233849
Epoch 1430/1500
  Batch 1/18, Loss: 0.0002205247146775946
  Batch 11/18, Loss: 0.0003648437559604645
Epoch 1431/1500
  Batch 1/18, Loss: 0.0003993297286797315
```

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  Batch 11/18, Loss: 0.000619491736870259
Epoch 1432/1500
  Batch 1/18, Loss: 0.00020948343444615602
  Batch 11/18, Loss: 0.00015916759730316699
Epoch 1433/1500
  Batch 1/18, Loss: 0.00019105811952613294
  Batch 11/18, Loss: 0.0005555718671530485
Epoch 1434/1500
  Batch 1/18, Loss: 0.00019349134527146816
  Batch 11/18, Loss: 0.0005253892159089446
Epoch 1435/1500
  Batch 1/18, Loss: 0.0009468487114645541
  Batch 11/18, Loss: 0.0004778472939506173
Epoch 1436/1500
  Batch 1/18, Loss: 0.00025918742176145315
  Batch 11/18, Loss: 0.0011207242496311665
Epoch 1437/1500
  Batch 1/18, Loss: 0.00014883744006510824
  Batch 11/18, Loss: 0.00035840150667354465
Epoch 1438/1500
  Batch 1/18, Loss: 0.00023328674433287233
  Batch 11/18, Loss: 0.0009279070654883981
Epoch 1439/1500
  Batch 1/18, Loss: 0.00033854570938274264
  Batch 11/18, Loss: 0.00024053052766248584
Epoch 1440/1500
  Batch 1/18, Loss: 0.00017220572044607252
  Batch 11/18, Loss: 0.0002586586633697152
Epoch 1441/1500
  Batch 1/18, Loss: 7.877488678786904e-05
  Batch 11/18, Loss: 0.00026009936118498445
Epoch 1442/1500
  Batch 1/18, Loss: 0.00019226546282880008
  Batch 11/18, Loss: 0.00019099189375992864
Epoch 1443/1500
  Batch 1/18, Loss: 0.0008723913342691958
  Batch 11/18, Loss: 0.0002897801750805229
Epoch 1444/1500
  Batch 1/18, Loss: 0.00015029699716251343
  Batch 11/18, Loss: 0.0001707475312286988
Epoch 1445/1500
  Batch 1/18, Loss: 0.0003603612130973488
  Batch 11/18, Loss: 0.00020492143812589347
Epoch 1446/1500
  Batch 1/18, Loss: 0.00016515745664946735
  Batch 11/18, Loss: 0.0001617076195543632
Epoch 1447/1500
  Batch 1/18, Loss: 0.0009456661064177752
```

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  Batch 11/18, Loss: 0.00020296273578424007
Epoch 1448/1500
  Batch 1/18, Loss: 0.00017746855155564845
  Batch 11/18, Loss: 0.0002108327462337911
Epoch 1449/1500
  Batch 1/18, Loss: 0.00031356082763522863
  Batch 11/18, Loss: 0.0003325598081573844
Epoch 1450/1500
  Batch 1/18, Loss: 0.00014825751713942736
  Batch 11/18, Loss: 0.00015793167403899133
Epoch 1451/1500
  Batch 1/18, Loss: 0.000202114722924307
  Batch 11/18, Loss: 0.000186494697118178
After epoch 1450, loss=0.0003149007388856262
Epoch 1452/1500
  Batch 1/18, Loss: 0.0009184750379063189
  Batch 11/18, Loss: 0.00023010780569165945
Epoch 1453/1500
  Batch 1/18, Loss: 0.00014868097787257284
  Batch 11/18, Loss: 0.0001786134234862402
Epoch 1454/1500
  Batch 1/18, Loss: 0.00032717548310756683
  Batch 11/18, Loss: 0.00016833598783705384
Epoch 1455/1500
  Batch 1/18, Loss: 0.0005425570416264236
  Batch 11/18, Loss: 0.0002460756222717464
Epoch 1456/1500
  Batch 1/18, Loss: 0.00012721918756142259
  Batch 11/18, Loss: 0.00027136554126627743
Epoch 1457/1500
  Batch 1/18, Loss: 0.0001389016688335687
  Batch 11/18, Loss: 0.0001572278852108866
Epoch 1458/1500
  Batch 1/18, Loss: 0.00010226191079709679
  Batch 11/18, Loss: 0.0005125040770508349
Epoch 1459/1500
  Batch 1/18, Loss: 0.00025900453329086304
  Batch 11/18, Loss: 0.0008687273948453367
Epoch 1460/1500
  Batch 1/18, Loss: 0.00011684649507515132
  Batch 11/18, Loss: 0.00020853815658483654
Epoch 1461/1500
  Batch 1/18, Loss: 0.00021546843345277011
  Batch 11/18, Loss: 0.00015176368469838053
Epoch 1462/1500
  Batch 1/18, Loss: 0.00016513840819243342
  Batch 11/18, Loss: 0.000154985609697178
Epoch 1463/1500
```

```
  Batch 1/18, Loss: 0.0004396438889671117
  Batch 11/18, Loss: 0.00013285884051583707
Epoch 1464/1500
  Batch 1/18, Loss: 0.00016050539852585644
  Batch 11/18, Loss: 0.000860298634506762
Epoch 1465/1500
  Batch 1/18, Loss: 0.0003610012645367533
  Batch 11/18, Loss: 0.00019791853264905512
Epoch 1466/1500
  Batch 1/18, Loss: 0.0002677152515389025
  Batch 11/18, Loss: 0.00034358273842372
Epoch 1467/1500
  Batch 1/18, Loss: 0.00014385764370672405
  Batch 11/18, Loss: 0.00025609819567762315
Epoch 1468/1500
  Batch 1/18, Loss: 0.00012068764044670388
  Batch 11/18, Loss: 0.00016269265324808657
Epoch 1469/1500
  Batch 1/18, Loss: 0.0002194108528783545
  Batch 11/18, Loss: 0.00014536625531036407
Epoch 1470/1500
  Batch 1/18, Loss: 0.00016414973651990294
  Batch 11/18, Loss: 0.000958258577156812
Epoch 1471/1500
  Batch 1/18, Loss: 0.0003184013476129621
  Batch 11/18, Loss: 0.0002006400318350643
Epoch 1472/1500
  Batch 1/18, Loss: 0.00018236499454360455
  Batch 11/18, Loss: 0.00010911092977039516
Epoch 1473/1500
  Batch 1/18, Loss: 0.00023673829855397344
  Batch 11/18, Loss: 0.00020290448446758091
Epoch 1474/1500
  Batch 1/18, Loss: 0.00012051704106852412
  Batch 11/18, Loss: 0.000172918094904162
Epoch 1475/1500
  Batch 1/18, Loss: 0.00023317270097322762
  Batch 11/18, Loss: 0.00022459823230747133
Epoch 1476/1500
  Batch 1/18, Loss: 0.00014626109623350203
  Batch 11/18, Loss: 0.00013532087905332446
Epoch 1477/1500
  Batch 1/18, Loss: 0.00028429419035091996
  Batch 11/18, Loss: 0.00017234875122085214
Epoch 1478/1500
  Batch 1/18, Loss: 0.00022790877847000957
  Batch 11/18, Loss: 0.0002512643113732338
Epoch 1479/1500
```

```
  Batch 1/18, Loss: 0.00025569560239091516
  Batch 11/18, Loss: 0.0002776783076114952
Epoch 1480/1500
  Batch 1/18, Loss: 0.0001675290841376409
  Batch 11/18, Loss: 0.0001566652936162427
Epoch 1481/1500
  Batch 1/18, Loss: 0.0001378773886244744
  Batch 11/18, Loss: 0.000919244484975934
Epoch 1482/1500
  Batch 1/18, Loss: 0.0009240279905498028
  Batch 11/18, Loss: 0.00030528640490956604
Epoch 1483/1500
  Batch 1/18, Loss: 9.739083179738373e-05
  Batch 11/18, Loss: 9.333693014923483e-05
Epoch 1484/1500
  Batch 1/18, Loss: 0.00013361343008000404
  Batch 11/18, Loss: 0.0002072378556476906
Epoch 1485/1500
  Batch 1/18, Loss: 0.0003244933905079961
  Batch 11/18, Loss: 0.00022213532065507025
Epoch 1486/1500
  Batch 1/18, Loss: 0.0002691876143217087
  Batch 11/18, Loss: 0.0010559819638729095
Epoch 1487/1500
  Batch 1/18, Loss: 0.00017890729941427708
  Batch 11/18, Loss: 0.00019426713697612286
Epoch 1488/1500
  Batch 1/18, Loss: 0.0002271006378578022
  Batch 11/18, Loss: 0.0009942753240466118
Epoch 1489/1500
  Batch 1/18, Loss: 0.00017101231787819415
  Batch 11/18, Loss: 0.0002656678552739322
Epoch 1490/1500
  Batch 1/18, Loss: 0.0002678335877135396
  Batch 11/18, Loss: 0.0002732139836996794
Epoch 1491/1500
  Batch 1/18, Loss: 0.0001399007742293179
  Batch 11/18, Loss: 0.0002318676997674629
Epoch 1492/1500
  Batch 1/18, Loss: 0.00012260109360795468
  Batch 11/18, Loss: 0.00041386374505236745
Epoch 1493/1500
  Batch 1/18, Loss: 0.00013573956675827503
  Batch 11/18, Loss: 0.00021891697542741895
Epoch 1494/1500
  Batch 1/18, Loss: 0.00017579327686689794
  Batch 11/18, Loss: 0.0002834067854564637
Epoch 1495/1500
```

```
  Batch 1/18, Loss: 0.00022861866455059499
  Batch 11/18, Loss: 0.0001813260605558753
Epoch 1496/1500
  Batch 1/18, Loss: 0.00067803671117872
  Batch 11/18, Loss: 0.0002587959461379796
Epoch 1497/1500
  Batch 1/18, Loss: 0.0003937160363420844
  Batch 11/18, Loss: 0.00016140338266268373
Epoch 1498/1500
  Batch 1/18, Loss: 0.00015754839114379138
  Batch 11/18, Loss: 0.0001900490024127066
Epoch 1499/1500
  Batch 1/18, Loss: 0.00013470703561324626
  Batch 11/18, Loss: 0.0005301081691868603
Epoch 1500/1500
  Batch 1/18, Loss: 0.00021437389659695327
  Batch 11/18, Loss: 0.00011224076297366992
```

[25]:
```python
preds = []
targets = []

for i, (batch, target) in enumerate(test_data):
    preds.append(model(batch).item())
    targets.append(target.item())
    if i % 10 == 0:
        print(f"Processing batch {i+1}/{len(test_data)}")

print("Prediction completed!")
```

```
Processing batch 1/1478
Processing batch 11/1478
Processing batch 21/1478
Processing batch 31/1478
Processing batch 41/1478
Processing batch 51/1478
Processing batch 61/1478
Processing batch 71/1478
Processing batch 81/1478
Processing batch 91/1478
Processing batch 101/1478
Processing batch 111/1478
Processing batch 121/1478
Processing batch 131/1478
Processing batch 141/1478
Processing batch 151/1478
Processing batch 161/1478
Processing batch 171/1478
Processing batch 181/1478
```
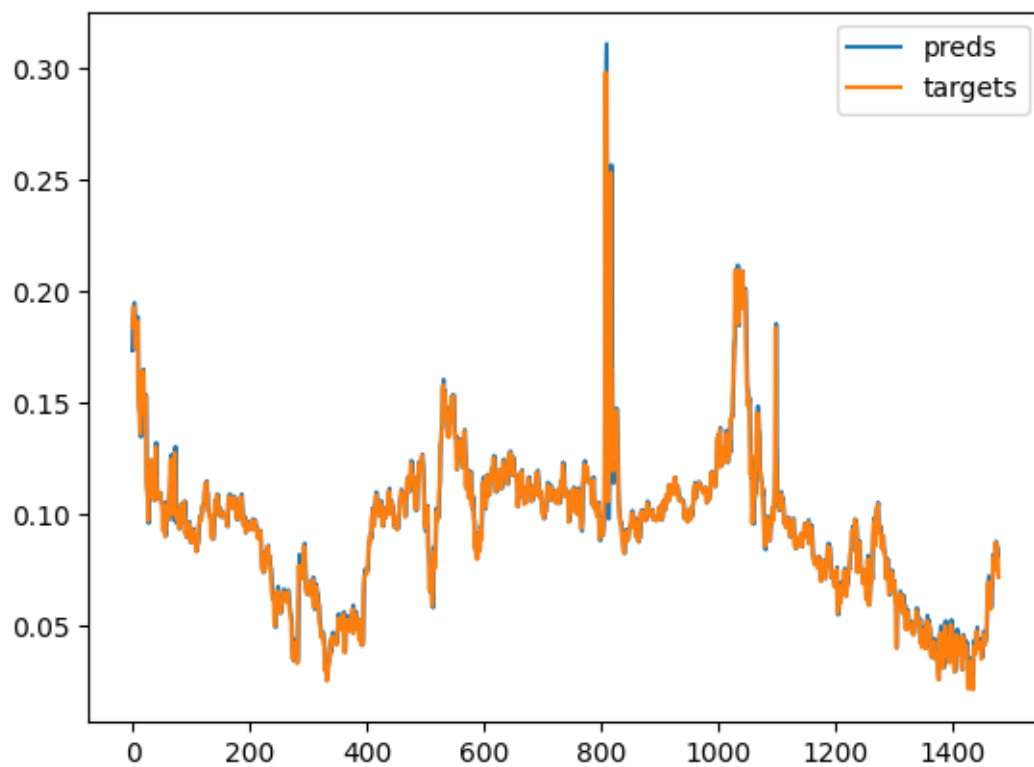
```
Processing batch 191/1478
Processing batch 201/1478
Processing batch 211/1478
Processing batch 221/1478
Processing batch 231/1478
Processing batch 241/1478
Processing batch 251/1478
Processing batch 261/1478
Processing batch 271/1478
Processing batch 281/1478
Processing batch 291/1478
Processing batch 301/1478
Processing batch 311/1478
Processing batch 321/1478
Processing batch 331/1478
Processing batch 341/1478
Processing batch 351/1478
Processing batch 361/1478
Processing batch 371/1478
Processing batch 381/1478
Processing batch 391/1478
Processing batch 401/1478
Processing batch 411/1478
Processing batch 421/1478
Processing batch 431/1478
Processing batch 441/1478
Processing batch 451/1478
Processing batch 461/1478
Processing batch 471/1478
Processing batch 481/1478
Processing batch 491/1478
Processing batch 501/1478
Processing batch 511/1478
Processing batch 521/1478
Processing batch 531/1478
Processing batch 541/1478
Processing batch 551/1478
Processing batch 561/1478
Processing batch 571/1478
Processing batch 581/1478
Processing batch 591/1478
Processing batch 601/1478
Processing batch 611/1478
Processing batch 621/1478
Processing batch 631/1478
Processing batch 641/1478
Processing batch 651/1478
Processing batch 661/1478
```

```
Processing batch 671/1478
Processing batch 681/1478
Processing batch 691/1478
Processing batch 701/1478
Processing batch 711/1478
Processing batch 721/1478
Processing batch 731/1478
Processing batch 741/1478
Processing batch 751/1478
Processing batch 761/1478
Processing batch 771/1478
Processing batch 781/1478
Processing batch 791/1478
Processing batch 801/1478
Processing batch 811/1478
Processing batch 821/1478
Processing batch 831/1478
Processing batch 841/1478
Processing batch 851/1478
Processing batch 861/1478
Processing batch 871/1478
Processing batch 881/1478
Processing batch 891/1478
Processing batch 901/1478
Processing batch 911/1478
Processing batch 921/1478
Processing batch 931/1478
Processing batch 941/1478
Processing batch 951/1478
Processing batch 961/1478
Processing batch 971/1478
Processing batch 981/1478
Processing batch 991/1478
Processing batch 1001/1478
Processing batch 1011/1478
Processing batch 1021/1478
Processing batch 1031/1478
Processing batch 1041/1478
Processing batch 1051/1478
Processing batch 1061/1478
Processing batch 1071/1478
Processing batch 1081/1478
Processing batch 1091/1478
Processing batch 1101/1478
Processing batch 1111/1478
Processing batch 1121/1478
Processing batch 1131/1478
Processing batch 1141/1478
```

```
Processing batch 1151/1478
Processing batch 1161/1478
Processing batch 1171/1478
Processing batch 1181/1478
Processing batch 1191/1478
Processing batch 1201/1478
Processing batch 1211/1478
Processing batch 1221/1478
Processing batch 1231/1478
Processing batch 1241/1478
Processing batch 1251/1478
Processing batch 1261/1478
Processing batch 1271/1478
Processing batch 1281/1478
Processing batch 1291/1478
Processing batch 1301/1478
Processing batch 1311/1478
Processing batch 1321/1478
Processing batch 1331/1478
Processing batch 1341/1478
Processing batch 1351/1478
Processing batch 1361/1478
Processing batch 1371/1478
Processing batch 1381/1478
Processing batch 1391/1478
Processing batch 1401/1478
Processing batch 1411/1478
Processing batch 1421/1478
Processing batch 1431/1478
Processing batch 1441/1478
Processing batch 1451/1478
Processing batch 1461/1478
Processing batch 1471/1478
Prediction completed!
```

```python
[26]: plt.plot(range(len(test_data)), preds, label="preds")
      plt.plot(range(len(test_data)), targets, label="targets")
      plt.legend()
      plt.show()
```

[ ]: