2025 USA-NA-AIO Round 1, Problem 2, Part 4

USAAIO Mar 2025

Part 4 (5 points, coding task)

Do the following tasks in this part.

1. Construct an object in the class `My_Linear_Numpy` called `linear_model_np`.
2. Set `in_features = 3` and `out_features = 5`.
3. Create multiple `X` with the following different shapes, but common numpy random seed number 2025 and the same standard normal distribution.
   - `(in_features,)`
   - `(10,in_features)`
   - `(10,20,in_features)`
   - `(10,20,30,in_features)`

   After generating `X`, reset the numpy random seed number to its default value.
4. We call our constructed function with each of the above `X` as the input. Print the shape of each output.

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```
### WRITE YOUR SOLUTION HERE ###

in_features = 3
```

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```
out_features = 5

linear_model_np = My_Linear_NumPy(in_features, out_features)

np.random.seed(2025)

X_list = [np.random.randn(in_features), np.random.randn(10,in_features), np.randc

np.random.seed()

for X in X_list:
    print(linear_model_np.forward(X).shape)

""" END OF THIS PART """
```

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