EE660 – Spring 2024 — Homework 5

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Collaborators: n/a In this Homework, I will apply DSM and EBM on all generators. Also I tried VAE and DDPM, but met problems when doing training so I gave up. However, the jupyter notebooks for the failed trails are also submitted.

1. Denosing Score Mathinc Method

In this part, I applied DSM on all four of the generators. The training process is recorded in four Jupyter notebooks:
Chekerbooks in `denoising_score_matching.ipynb`, PinWheel in `denoising_score_matching_pin.ipynb`, Spiral in `denoising_score_matching_Spin.ipynb` and Gaussian Mixtures in `denoising_score_matching_Gaussian.ipynb`.
I applied the same superparameters for all four datasets:

```
The MLP has 2 hidden layers with 64 nerons on each layer, and 2 on output layer.
Activation: Swish Function.
Learning Rate: 0.001.
Optimizer: Adam.
Batch size: 128.
Number of Epoches: 5000,
Noise Level: 0.1.
```

2. Energy Based Model

In this part, I applied DSM on all four of the generators. The training process is recorded in four Jupyter notebooks:
Chekerbooks in `EBM.ipynb`, PinWheel in `EBM_pin.ipynb`, Spiral in `EBM_Spin.ipynb` and Gaussian Mixtures in `EBM_Gaussian.ipynb`.