

Weak Lensing Mass Reconstruction with cGAN

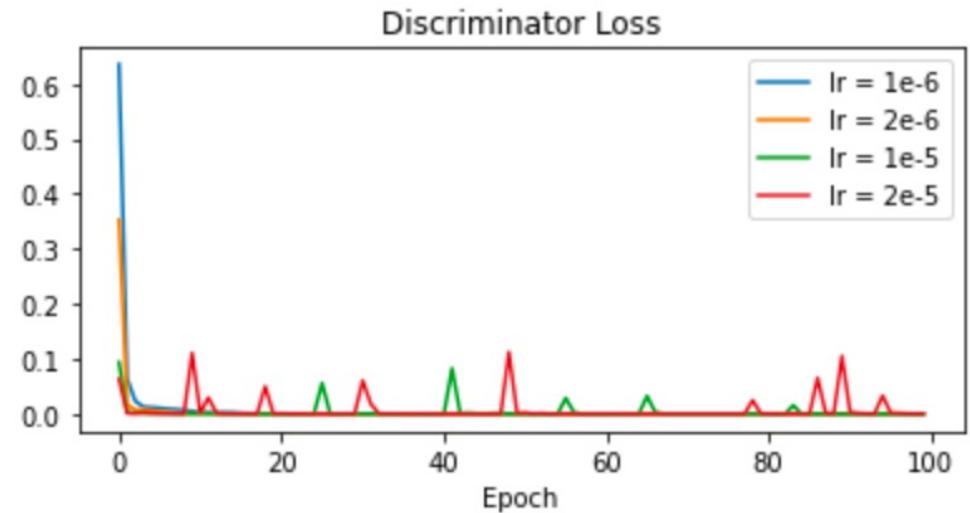
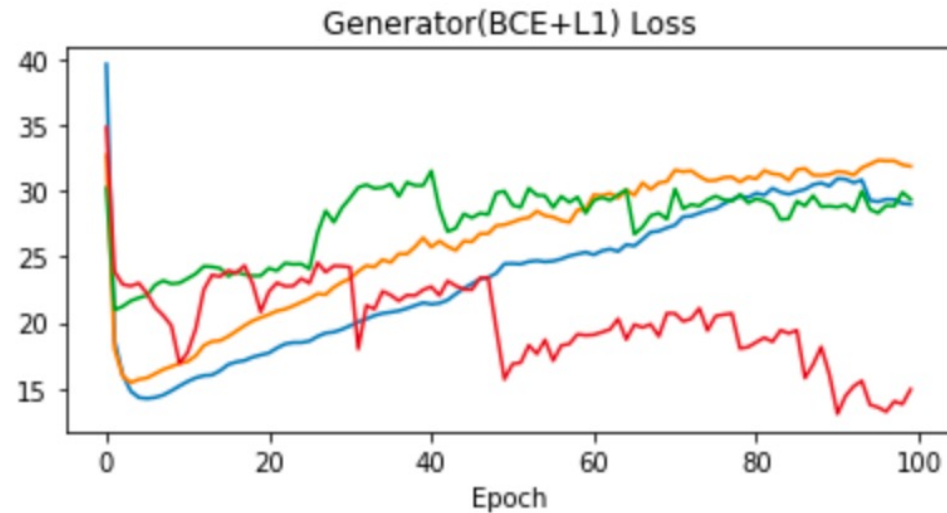
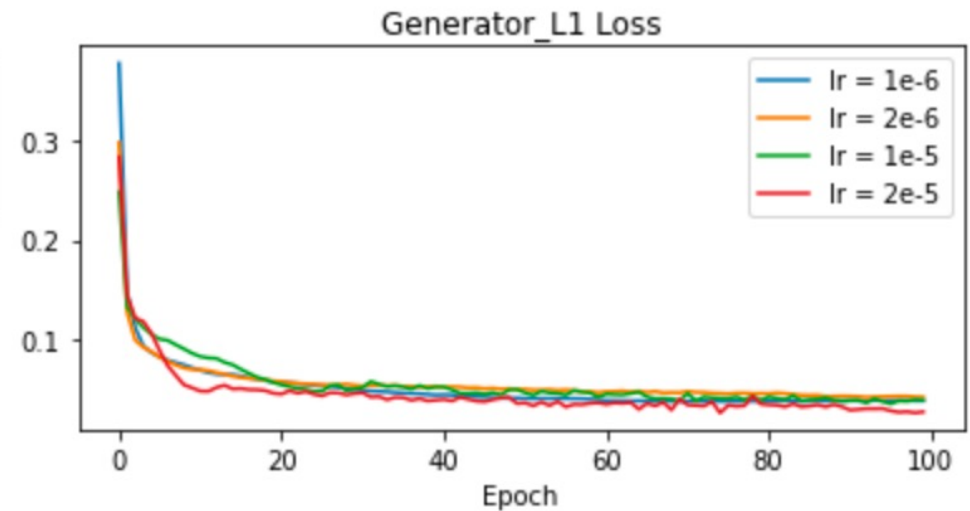
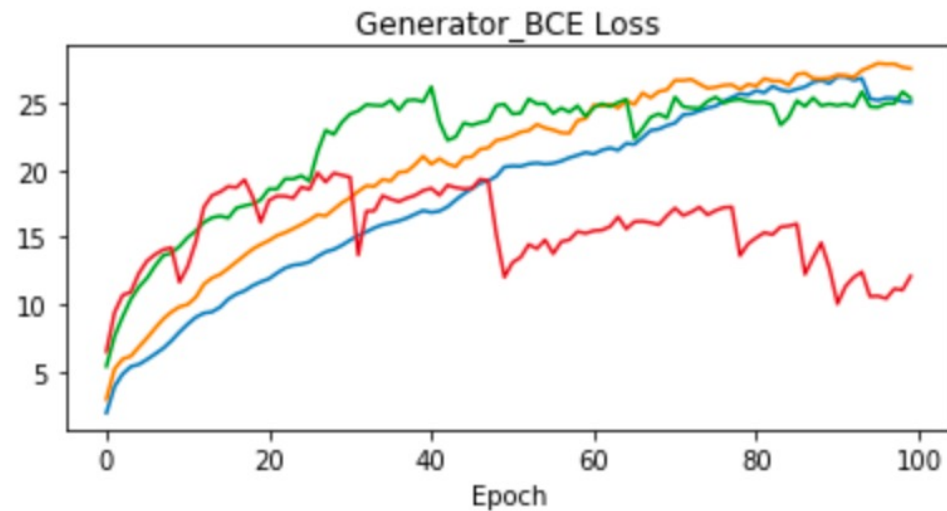
2022.02

Loss Function Issues

- Implementing BCE loss gives NaN loss → Due to the exponential from sigmoid?
- Therefore it is recommended to use tf built-in loss, or transform your loss function to prevent NaN.
- `tf.keras.losses.BinaryCrossEntropy(from_logits=True→False)` after eliminating the last Activation Layer (sigmoid) in Discriminator

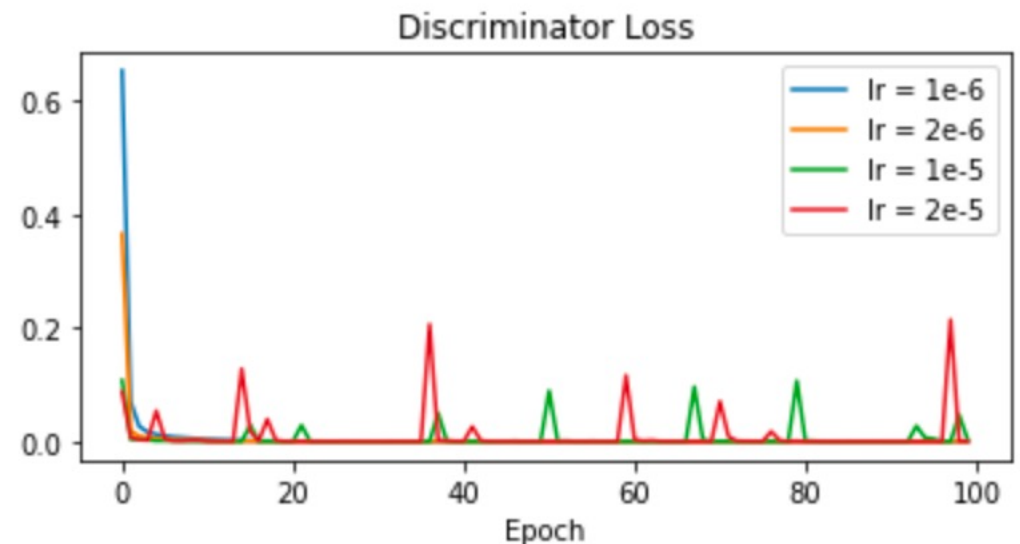
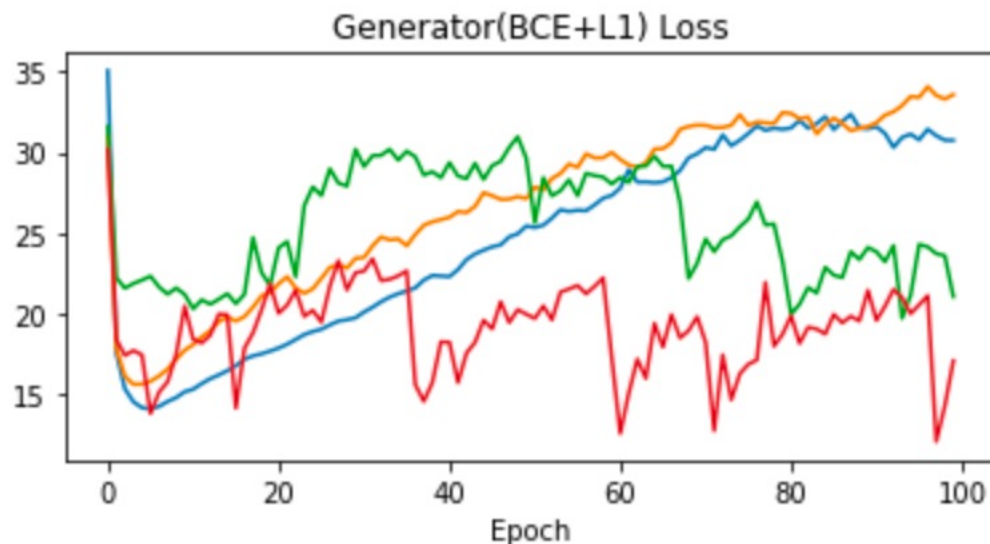
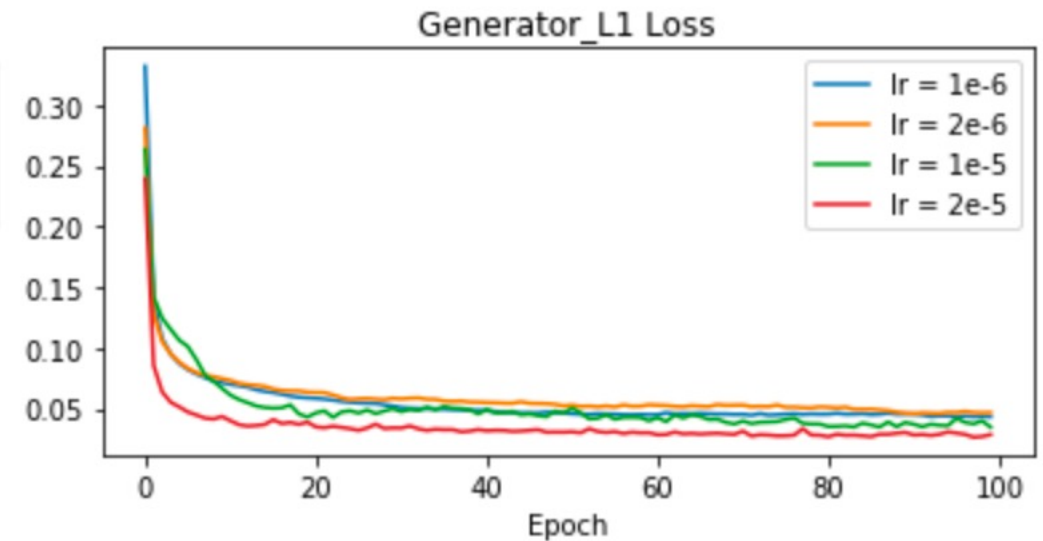
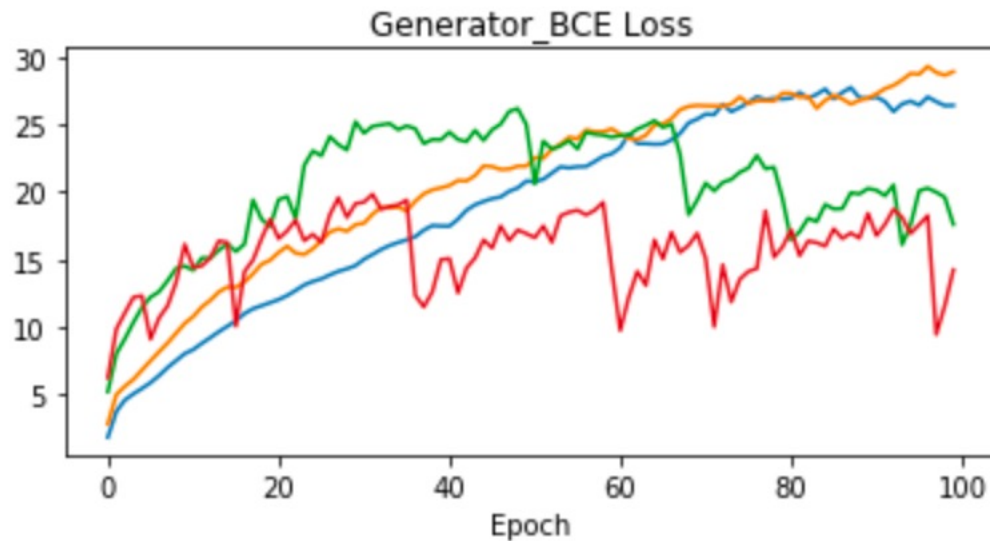
Tests on Learning Rates

Kernel_size = 20



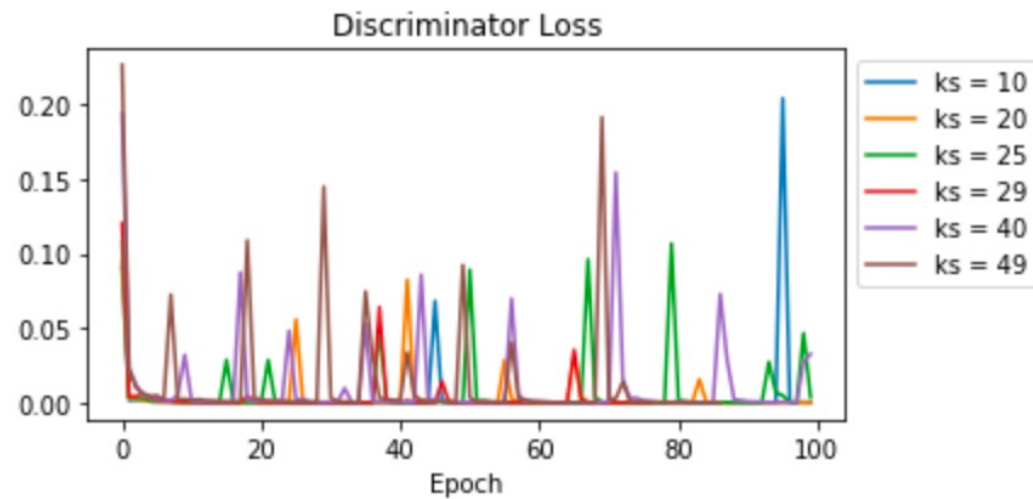
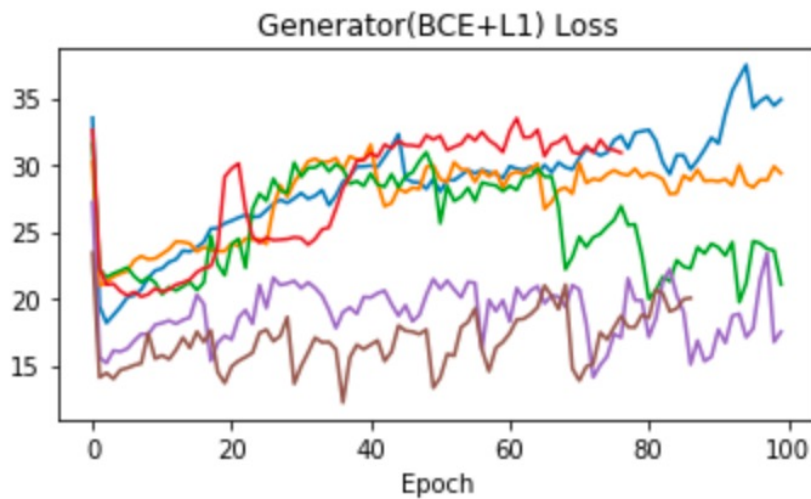
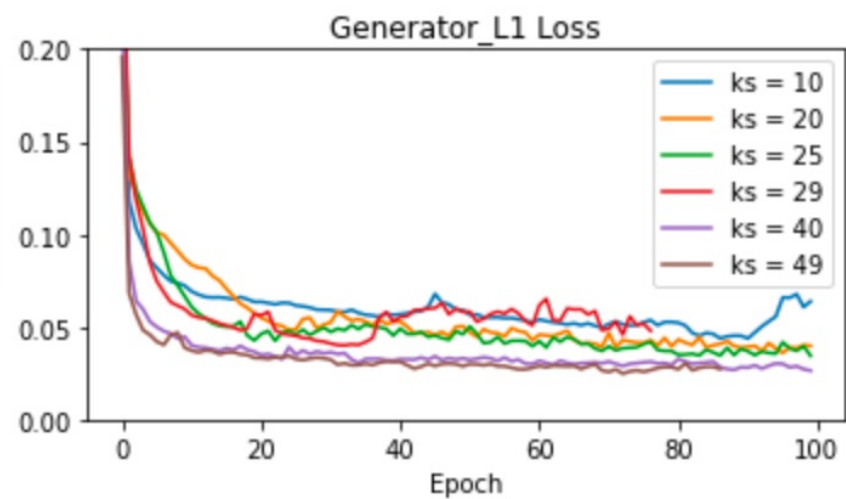
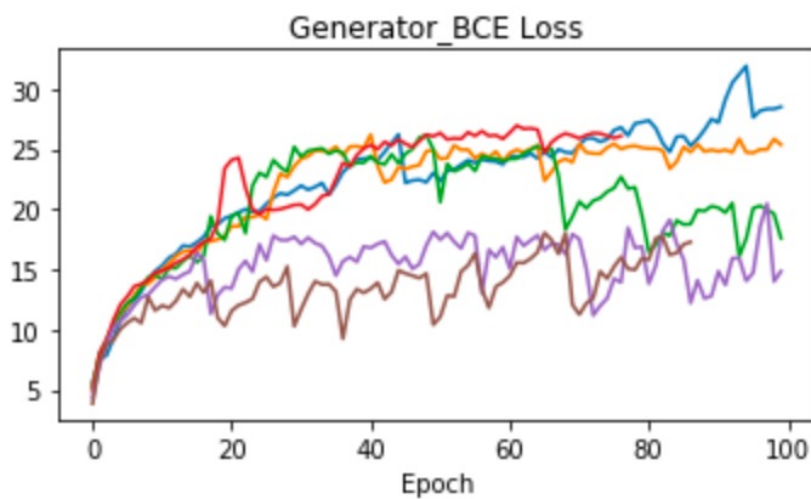
Tests on Learning Rates

Kernel_size = 25



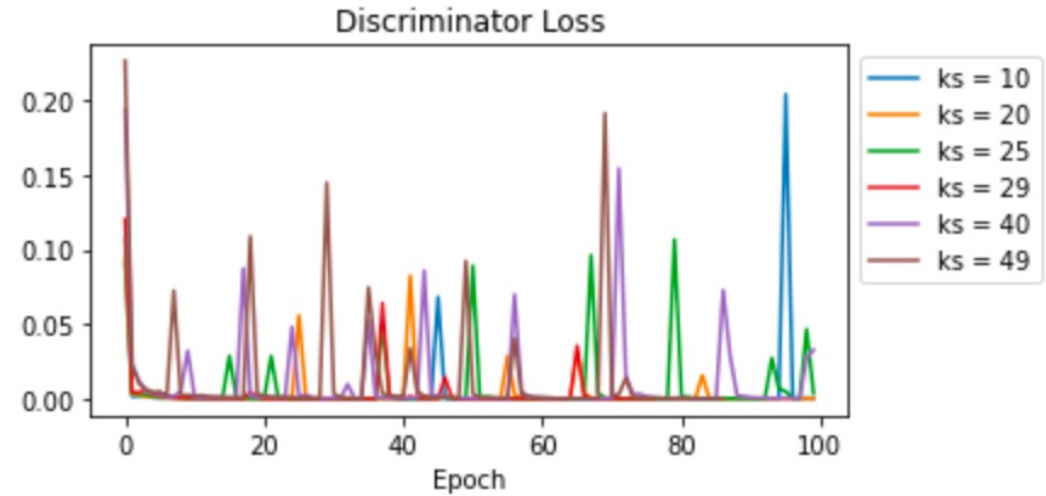
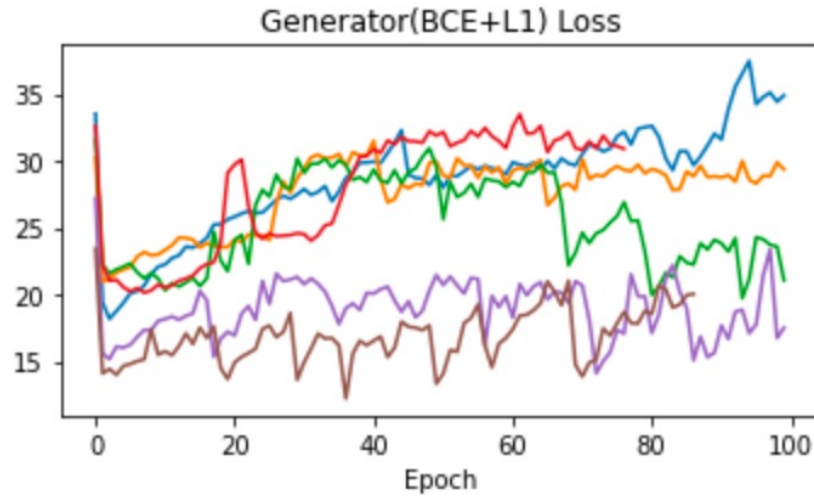
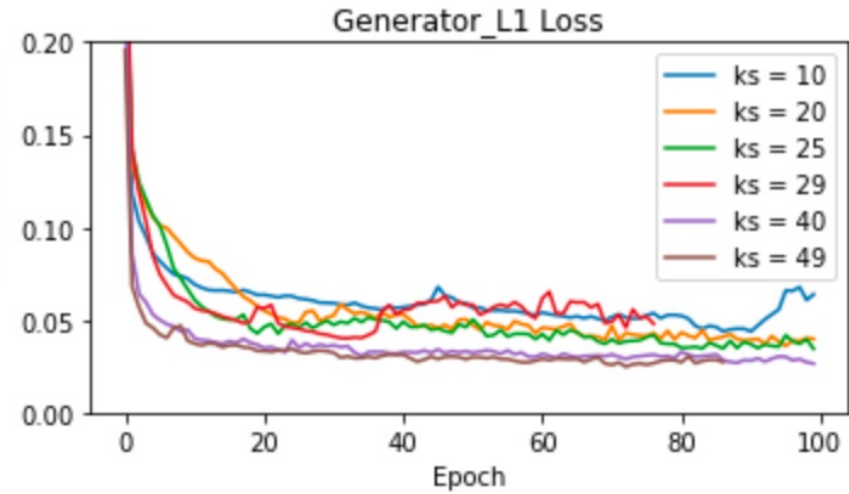
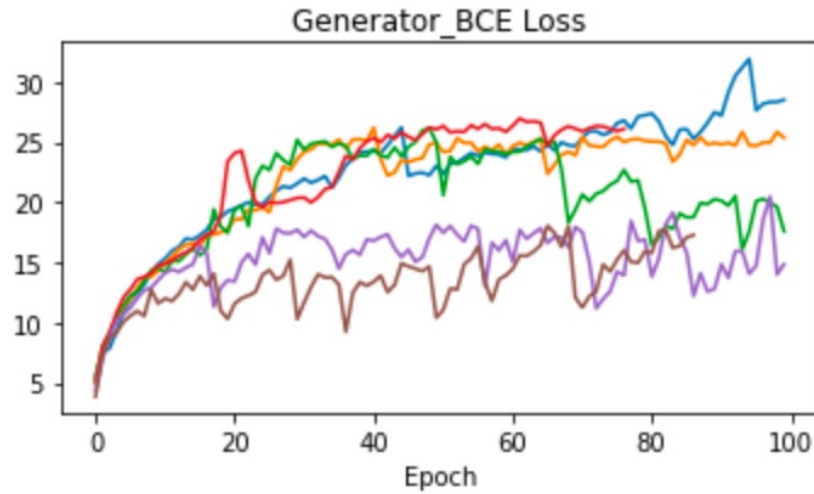
Tests on Kernel Sizes

Learning Rate=1e-5

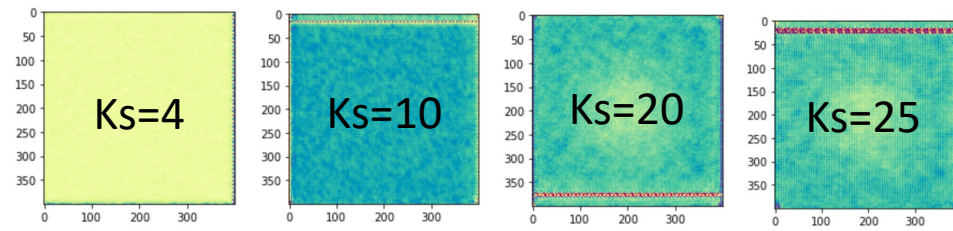


Tests on Kernel Sizes

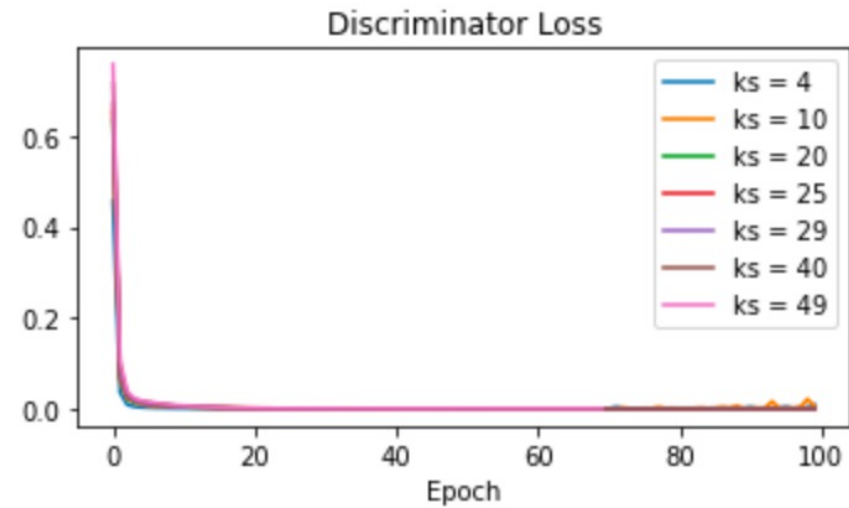
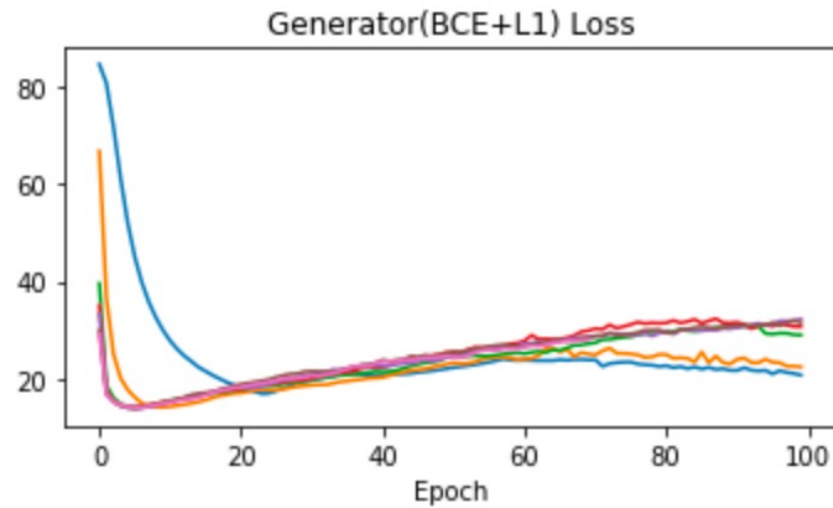
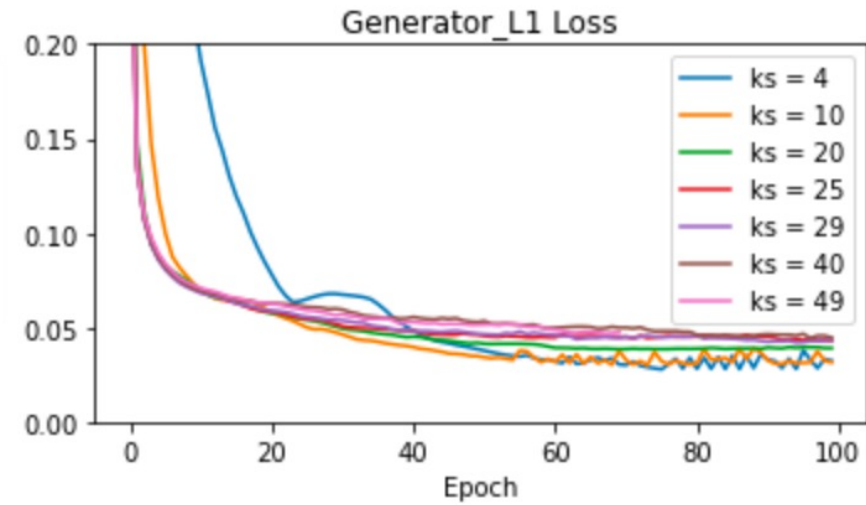
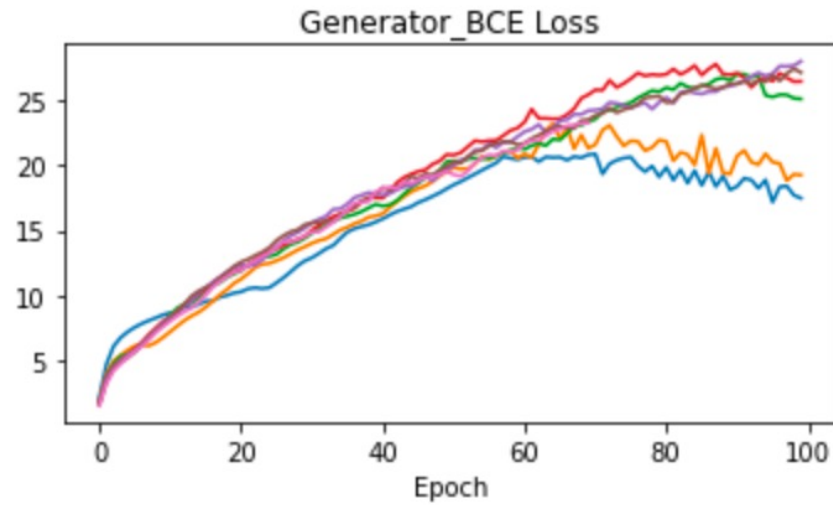
Learning Rate=2e-6



Tests on Kernel Sizes



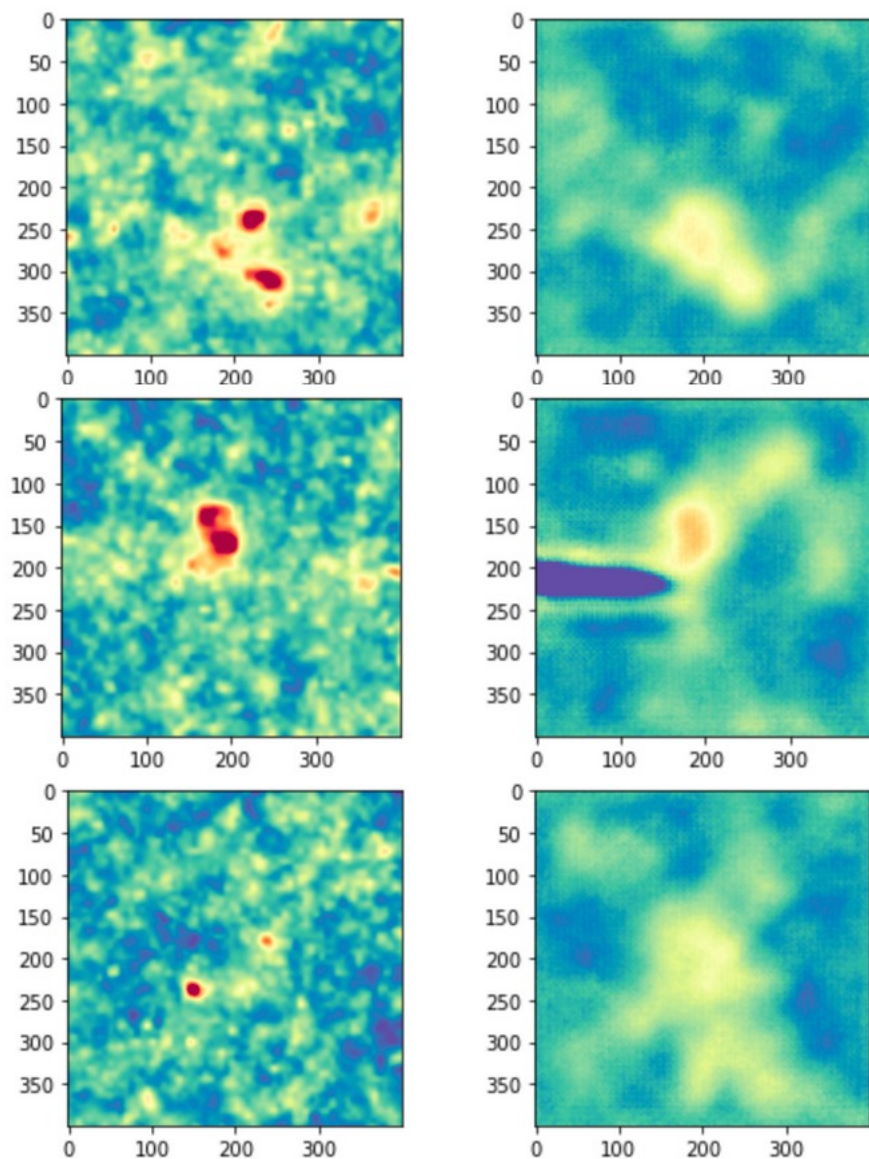
Learning Rate=1e-6



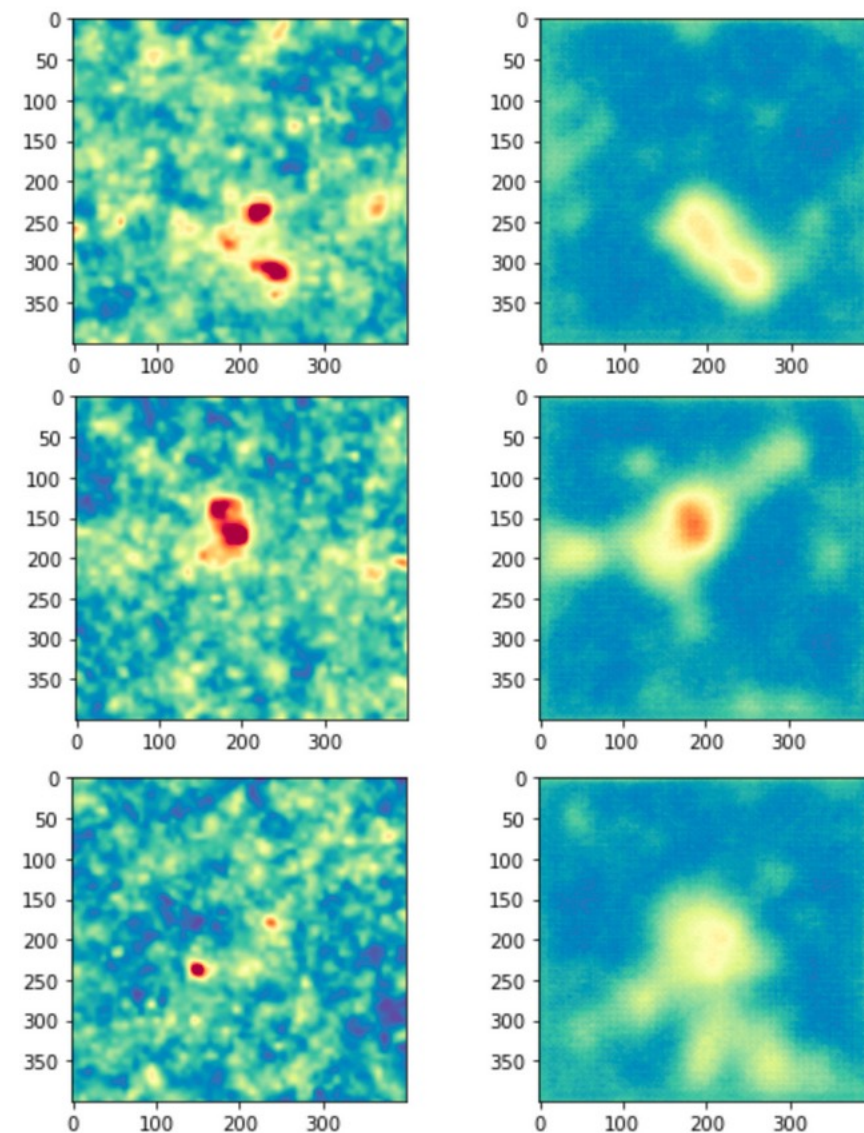
Tests on Kernel Sizes

$LR=2e-5$

$KS = 25$



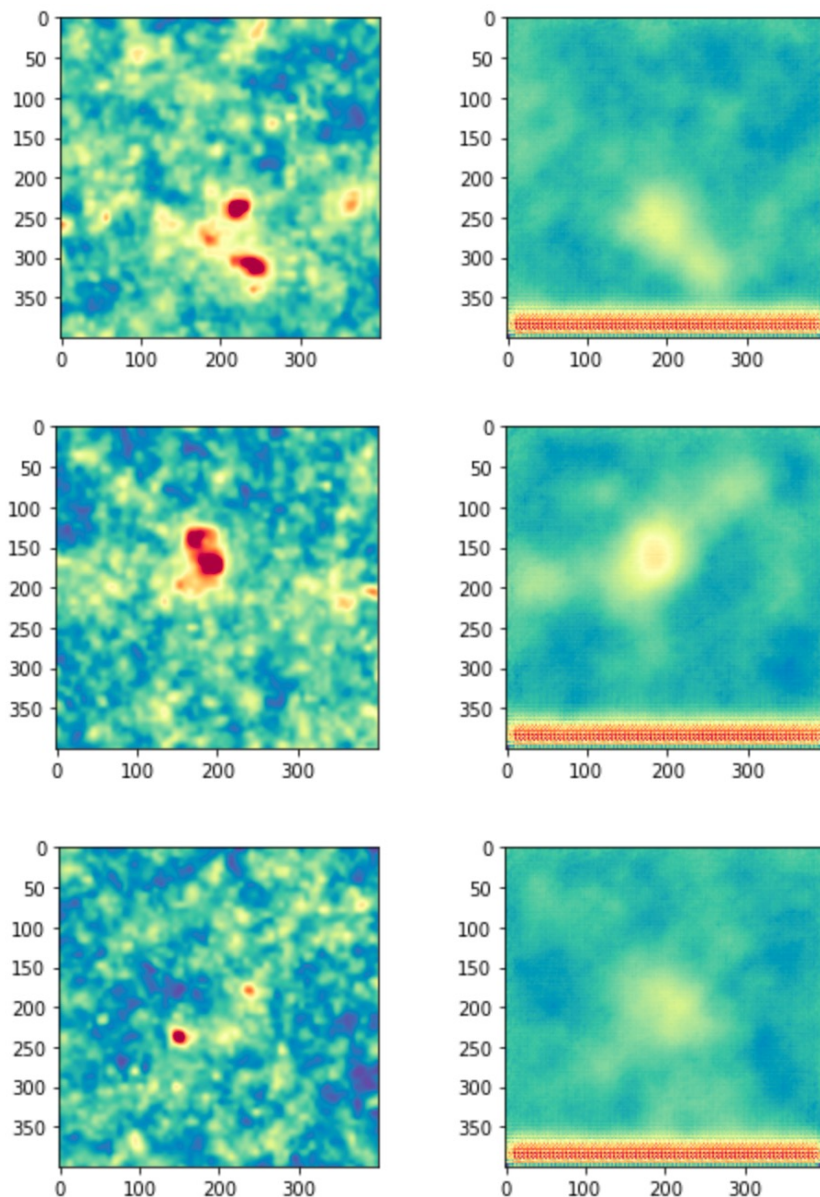
$KS= 29$



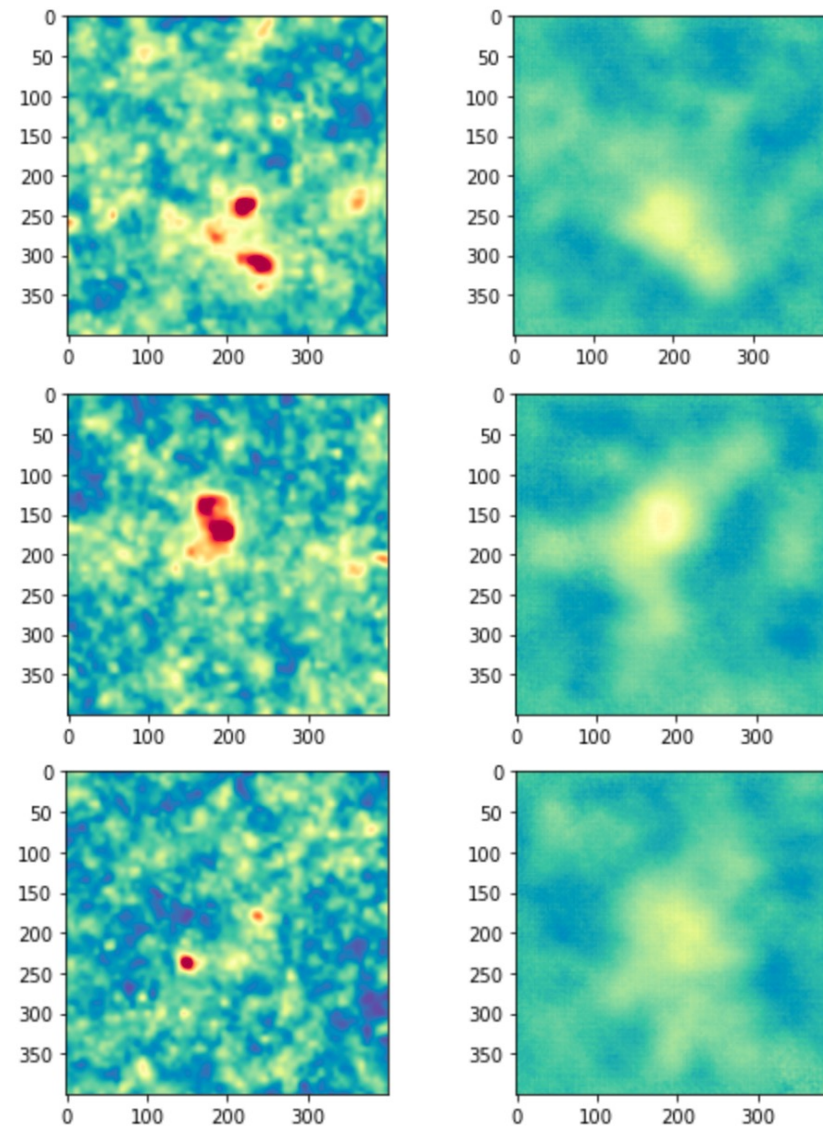
Tests on Kernel Sizes

$LR=1e-5$

$KS = 25$



$KS= 40$



Summary

- Kernel size~4 is too small for our problem. Should be at least larger than 20
- We could see the possibility even with “double” sigmoid.
- We want our discriminator to go through pain.