

VALIDAÇÃO de RESULTADOS TP1

Parâmetros:

- Downsampling 4:2:2; interpolação linear
- QF = 75

Resultados a obter:

- **Imagens** (encoder e decoder)
- **Matrizes** correspondentes no bloco de coordenadas [8: 16, 8: 16]
- **Erros** na imagem recuperada

Img Orig



Encoder

R



G



B



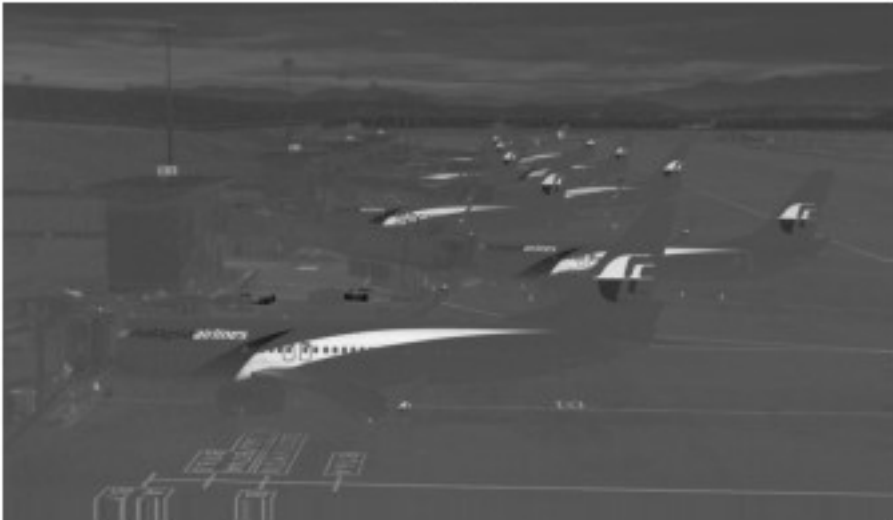
R [8:16, 8:16]

```
[[209 212 210 208 208 210 210 207]
 [209 210 210 208 208 210 210 208]
 [209 211 211 210 210 211 212 210]
 [210 212 212 212 212 215 215 213]
 [212 213 213 215 215 216 216 216]
 [216 214 216 217 217 217 217 217]
 [219 218 218 221 221 218 218 218]
 [223 220 220 223 223 219 219 219]]
```

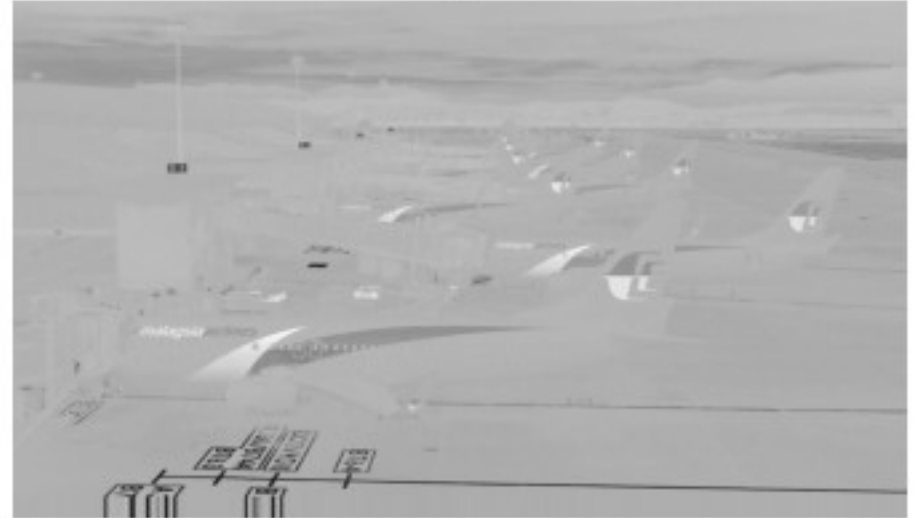
Y



Cr



Cb



Y [8:16, 8:16]

[[222.758 223.068 223.057 223.046 223.046 223.057 223.057 222.046]
[222.758 223.057 223.057 223.046 223.046 223.057 223.057 223.046]
[222.758 224.057 224.057 223.758 223.758 224.057 225.057 223.758]
[224.117 224.829 224.829 224.829 224.829 225.84 225.84 226.057]
[224.829 225.829 225.829 225.84 225.84 226.84 226.84 226.84]
[227.313 226.715 227.313 227.025 227.025 228.313 228.313 227.025]
[228.797 229.085 229.085 229.395 229.036 229.313 229.313 228.025]
[231.395 231.085 231.085 230.107 230.107 230.085 230.085 228.797]]

Cb[8:16, 8:16]

[[136.037 135.862 135.869 135.875 135.875 135.869 135.869 135.875]
[136.037 135.869 135.869 135.875 135.875 135.869 135.869 135.875]
[136.037 135.869 135.869 136.037 136.037 135.869 135.869 136.037]
[134.706 134.869 134.869 134.869 134.869 134.862 134.862 135.869]
[134.869 134.869 134.869 134.862 134.862 134.862 134.862 134.862]
[134.031 134.369 134.031 134.194 134.194 134.031 134.031 134.194]
[133.194 133.031 133.031 132.856 134.187 134.031 134.031 134.194]
[132.856 133.031 133.031 133.019 133.019 133.031 133.031 133.194]]

Y downsampling 4:2:2



Cb downsampling 4:2:2



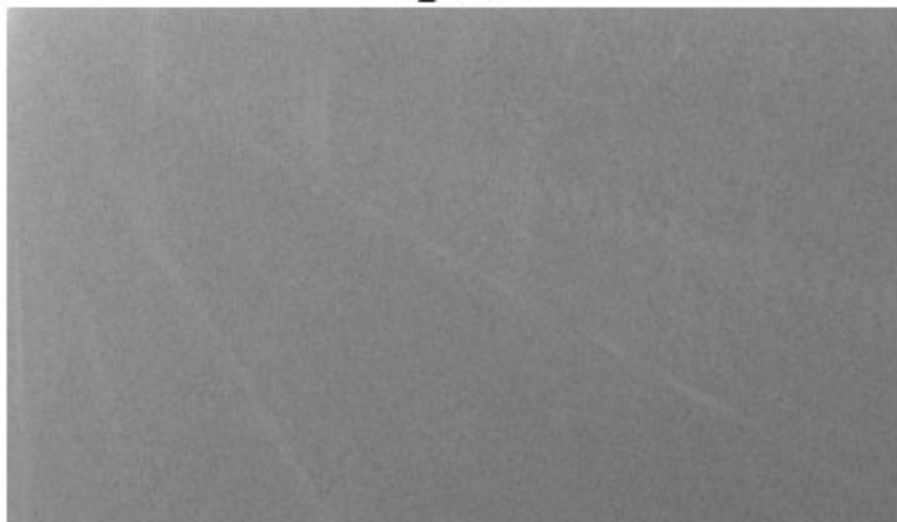
Cr downsampling 4:2:2



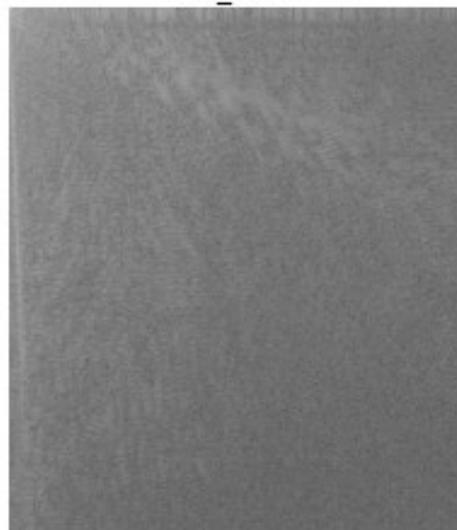
Cb [8:16, 8:16]

```
[[136.037 135.862 135.869 135.875 135.875 135.869 135.869 135.875]  
[136.037 135.869 135.869 135.875 135.875 135.869 135.869 135.875]  
[136.037 135.869 135.869 136.037 136.037 135.869 135.869 136.037]  
[134.706 134.869 134.869 134.869 134.869 134.862 134.862 135.869]  
[134.869 134.869 134.869 134.862 134.862 134.862 134.862 134.862]  
[134.031 134.369 134.031 134.194 134.194 134.031 134.031 134.194]  
[133.194 133.031 133.031 132.856 134.187 134.031 134.031 134.194]  
[132.856 133.031 133.031 133.019 133.019 133.031 133.031 133.194]]
```

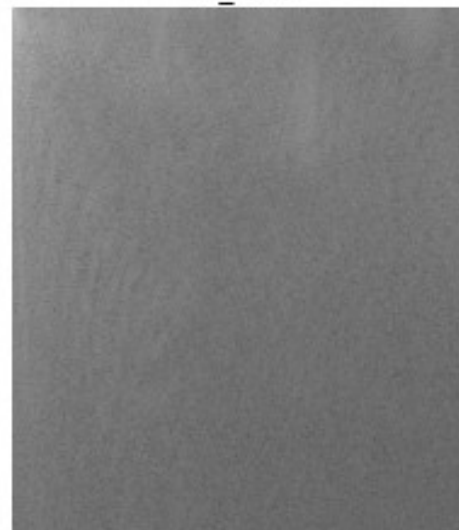
Y_DCT



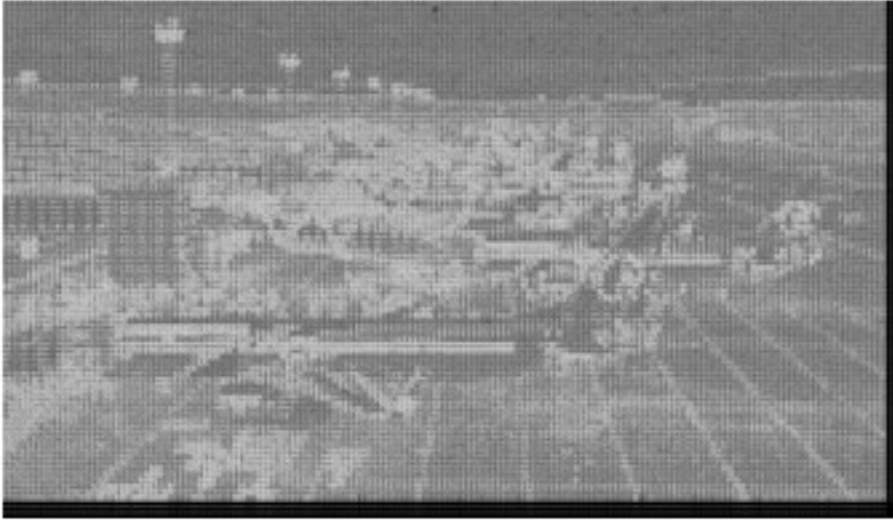
Cb_DCT



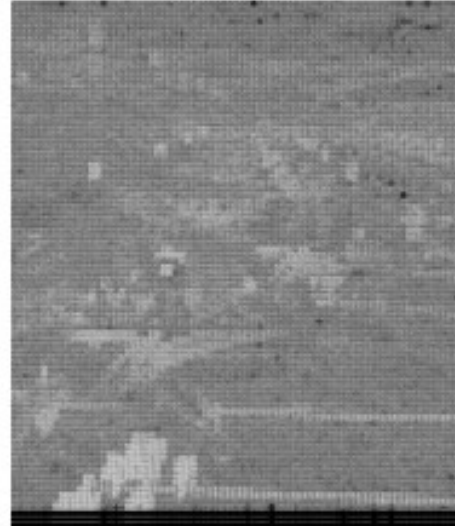
Cr_DCT



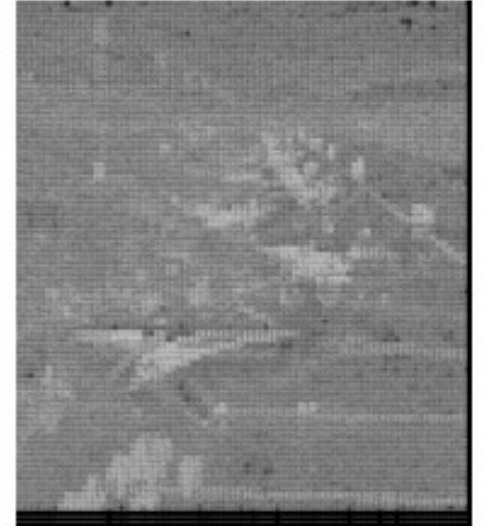
Yb_DCT



Cbb_DCT

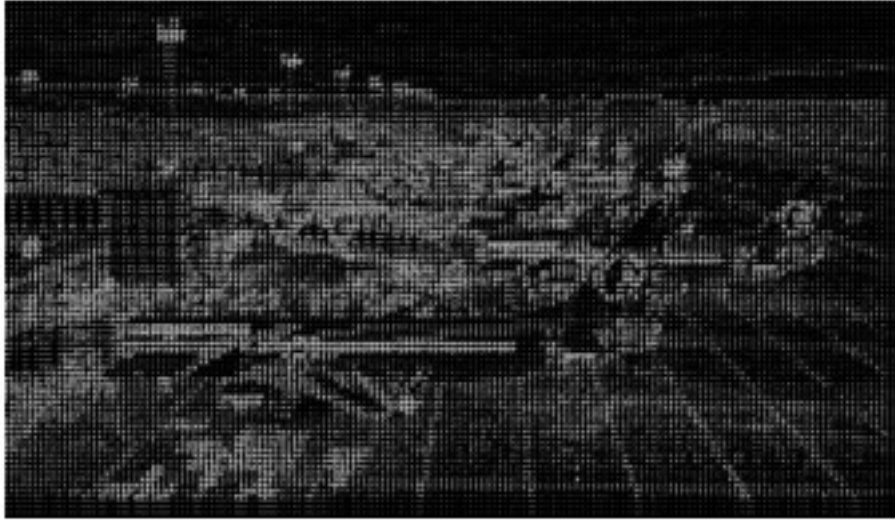


Crb_DCT



Yb_DCT8x8 [8:16, 8:16]

```
[[ 1.80777663e+03 -9.23242261e-01 -5.29636497e-01  3.59445648e-01 -1.76362500e+00  5.55083588e-01 -2.98406749e-01 -4.60890519e-02]
 [-2.03673479e+01 -9.82171542e-01 -8.86593039e-02 -5.92479366e-01  2.05786124e-01 -4.40442200e-01 -2.79880553e-01 -8.09695807e-02]
 [ 3.01421591e+00  2.96358656e+00 -5.05785655e-01  5.32572109e-01  2.78262642e-01  2.64984553e-01 -1.70624815e-01  4.42421783e-01]
 [-1.55397910e+00 -5.90294119e-01 -2.27573528e-01  4.87826728e-01  1.58910590e-01  2.61243202e-01  3.27367962e-01 -2.07981922e-01]
 [ 1.15787500e+00  2.03021506e-01  2.68178989e-01 -1.23757464e-01  7.06250000e-02 -4.00909176e-01  1.85897985e-01 -9.99756393e-02]
 [ 3.91716121e-01 -2.49542185e-01 -3.88121070e-01  8.46698258e-02 -1.12999755e-01  1.77816633e-01 -2.46778824e-01 -1.26352968e-01]
 [ 1.25161893e-01  2.41893572e-01  1.28375185e-01  3.35478925e-01 -5.71082576e-01  4.37425155e-01 -4.84643446e-02  3.97998520e-01]
 [-1.29250561e-01 -1.08042957e-01 -4.65970112e-01 -3.52498952e-01 -3.18990577e-01 -1.04955260e-01 -5.53132343e-01 -1.24718188e-02]]
```

$$Yb_Q$$


Cbb_Q



Crb_Q



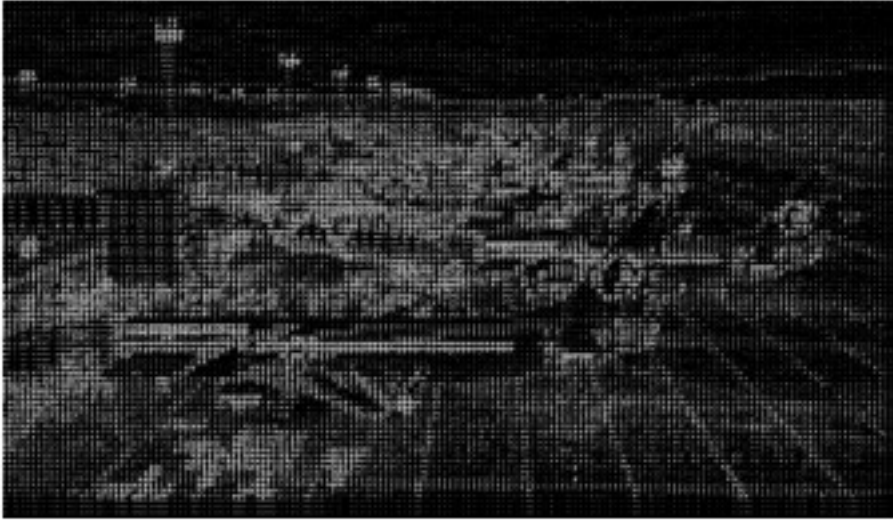
QY

```
[[ 8 6 5 8 12 20 26 30]
 [ 6 6 7 10 13 29 30 28]
 [ 7 6 8 12 20 28 34 28]
 [ 7 8 11 14 26 44 40 31]
 [ 9 11 18 28 34 54 52 38]
 [12 18 28 32 40 52 56 46]
 [24 32 39 44 52 60 60 50]
 [36 46 48 49 56 50 52 50]]
```

Yb_Q [8:16, 8:16]

[illegible]

Yb_DPCM



Cbb_DPCM



Crb_DPCM

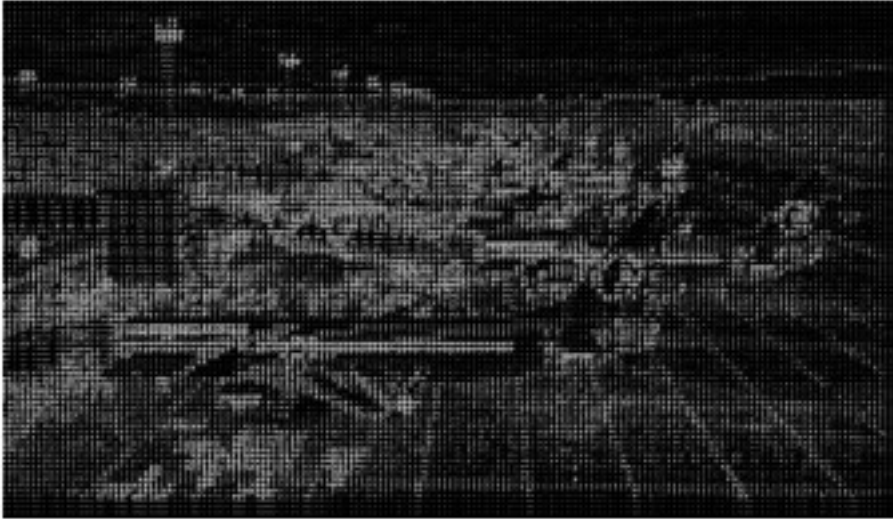


Yb_DPCM [8:16, 8:16]

[illegible]

Decoder

Yb_iDPCM



Cbb_iDPCM



Crb_iDPCM



Yb_iDPCM [8:16, 8:16]

```
[[226 0 0 0 0 0 0 0]
 [-3 0 0 0 0 0 0 0]
 [ 0 0 0 0 0 0 0 0]
 [ 0 0 0 0 0 0 0 0]
 [ 0 0 0 0 0 0 0 0]
 [ 0 0 0 0 0 0 0 0]
 [ 0 0 0 0 0 0 0 0]
 [ 0 0 0 0 0 0 0 0]]
```

A high-contrast, black and white photograph of a person's face, heavily shadowed and distorted by a grid-like pattern, possibly a screen or a mask. The image is grainy and has a high level of contrast, with the face appearing as a bright, somewhat indistinct shape against a dark background. The grid pattern is most prominent in the upper right quadrant, where it appears as a series of bright, intersecting lines. The overall effect is one of mystery and distortion, with the person's features being partially obscured and altered by the grid.

```
[[ 8 6 5 8 12 20 26 30]
 [ 6 6 7 10 13 29 30 28]
 [ 7 6 8 12 20 28 34 28]
 [ 7 8 11 14 26 44 40 31]
 [ 9 11 18 28 34 54 52 38]
 [12 18 28 32 40 52 56 46]
 [24 32 39 44 52 60 60 50]
 [36 46 48 49 56 50 52 50]]
```

[illegible]

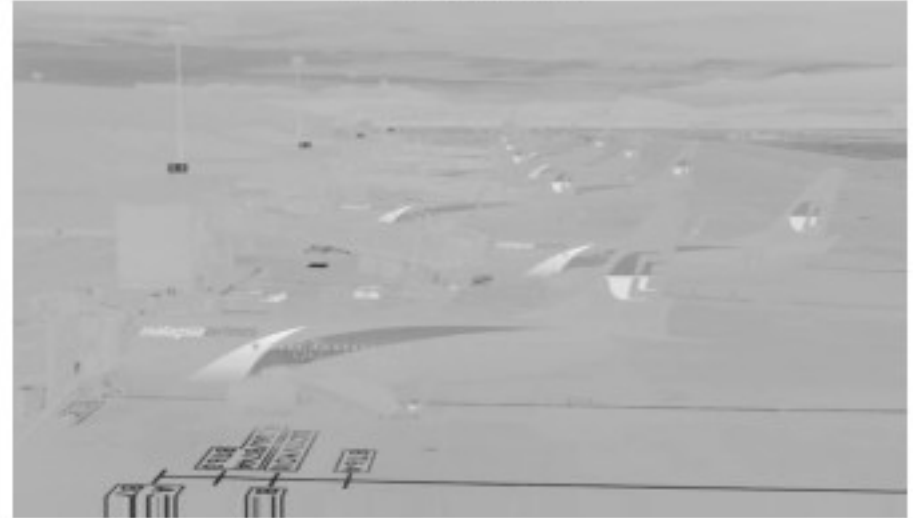
An aerial photograph of a large airport terminal building with multiple runways and taxiways. The terminal is a long, rectangular structure with a series of smaller buildings attached to it. The runways are wide, paved areas that extend from the terminal. The taxiways are narrower, paved areas that connect the runways. The surrounding area is mostly flat and open, with some trees and vegetation visible.

[222.87916035 222.87916035 222.87916035 222.87916035 222.87916035 222.87916035 222.87916035 222.87916035]
[223.35427989 223.35427989 223.35427989 223.35427989 223.35427989 223.35427989 223.35427989 223.35427989]
[224.23218634 224.23218634 224.23218634 224.23218634 224.23218634 224.23218634 224.23218634 224.23218634]
[225.3792264 225.3792264 225.3792264 225.3792264 225.3792264 225.3792264 225.3792264 225.3792264]
[226.6207736 226.6207736 226.6207736 226.6207736 226.6207736 226.6207736 226.6207736 226.6207736]
[227.76781366 227.76781366 227.76781366 227.76781366 227.76781366 227.76781366 227.76781366 227.76781366]

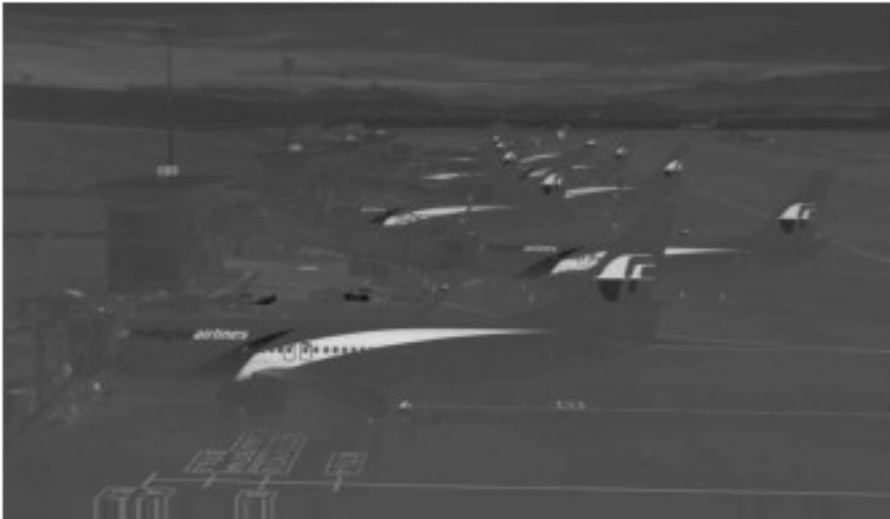
Y upsampling



Cb upsampling



Cr upsampling



Cb_UP [8:16, 8:16]

```
[136.56 136.56 136.56 136.56 136.56 136.56 136.56 136.56 ]  
[136.323 136.323 136.323 136.323 136.323 136.323 136.323 136.323]  
[135.884 135.884 135.884 135.884 135.884 135.884 135.884 135.884]  
[135.31 135.31 135.31 135.31 135.31 135.31 135.31 135.31 ]  
[134.69 134.69 134.69 134.69 134.69 134.69 134.69 134.69 ]  
[134.116 134.116 134.116 134.116 134.116 134.116 134.116 134.116]  
[133.677 133.677 133.677 133.677 133.677 133.677 133.677 133.677]  
[133.44 133.44 133.44 133.44 133.44 133.44 133.44 133.44 ]]
```

Img Reconstr

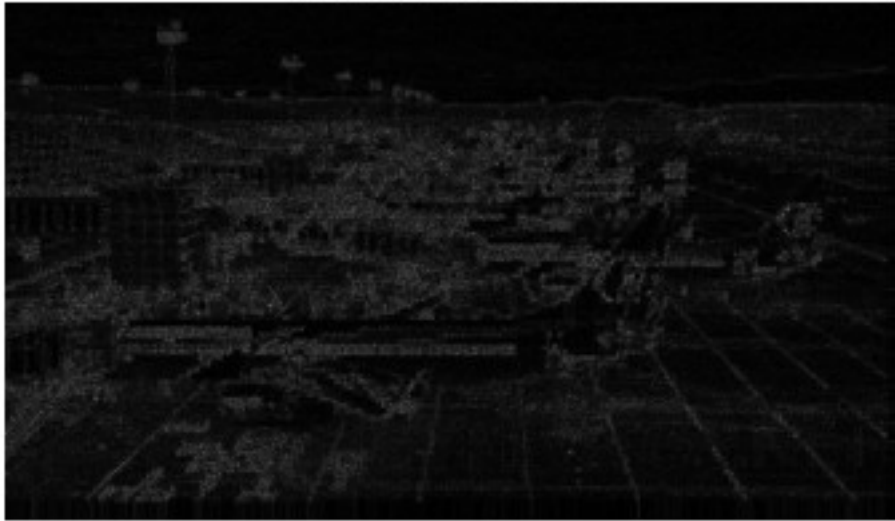


R_decoded [8:16, 8:16]

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[[209 209 209 209 209 209 209 209]
 [210 210 210 210 210 210 210 210]
 [212 212 212 212 212 212 212 211]
 [214 214 214 214 214 214 214 213]
 [216 216 216 216 216 216 216 215]
 [218 218 218 218 218 218 218 217]
 [219 219 219 219 219 219 219 219]
 [220 220 220 220 220 220 220 220]]
```

Erros

Imagem diferenças



Erros no canal Y:

Max diff: 42.59069819768291

Avg diff: 2.6200078911493367

Erros na imagem de 3 canais reconstruída:

MSE = 91.10299012345679

RMSE = 9.544788636918934

SNR = 30.055578935200067

PSNR = 28.53547729528211