SSIM

- Интенсивность $\mu_x = \frac{1}{N}\sum_{n=1}^{N} x_n,$
- Контрастность $\sigma_x = \sqrt{\frac{1}{N-1}\sum_{n=1}^{N}(x_n - \mu_x)^2},$
- Структура $\zeta_x = \frac{\mathbf{x} - \mu_x}{\sigma_x}.$

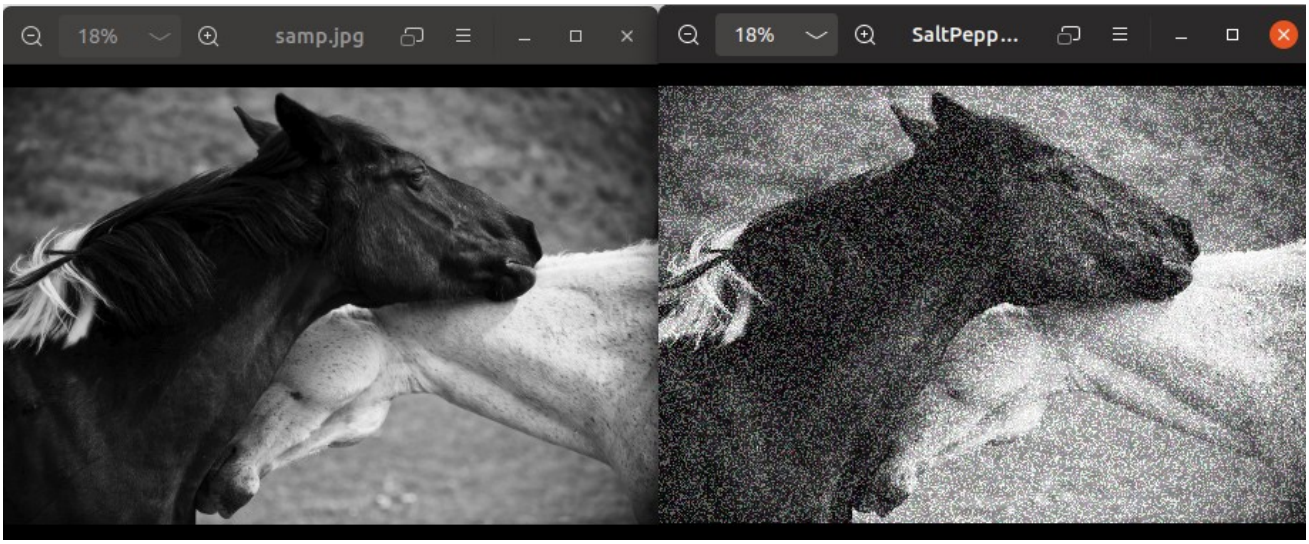
$$SSIM(\mathbf{x},\mathbf{y}) = l(\mathbf{x},\mathbf{y})^{\alpha} \cdot c(\mathbf{x},\mathbf{y})^{\beta} \cdot s(\mathbf{x},\mathbf{y})^{\gamma},$$

$$l(\mathbf{x},\mathbf{y}) = \frac{2\mu_x\mu_y + C_1}{\mu_x^2 + \mu_y^2 + C_1} \qquad c(\mathbf{x},\mathbf{y}) = \frac{2\sigma_x\sigma_y + C_2}{\sigma_x^2 + \sigma_y^2 + C_2} \qquad s(\mathbf{x},\mathbf{y}) = \frac{\langle \zeta_x, \zeta_y \rangle + C_3}{\sigma_x\sigma_y + C_3} = \frac{\sigma_{xy} + C_3}{\sigma_x\sigma_y + C_3}$$

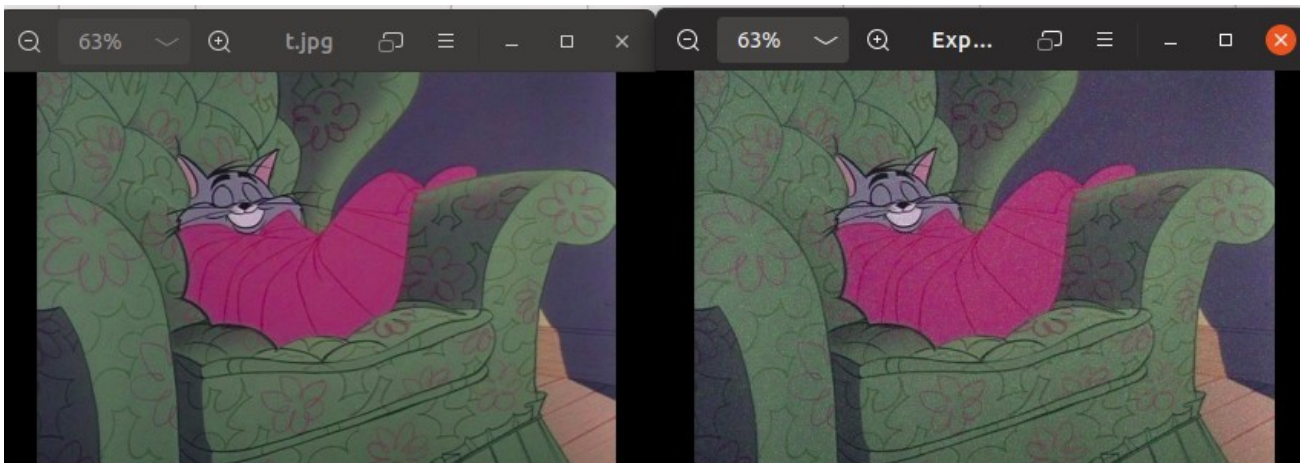
Pic 1 – metrics

Noise samples :

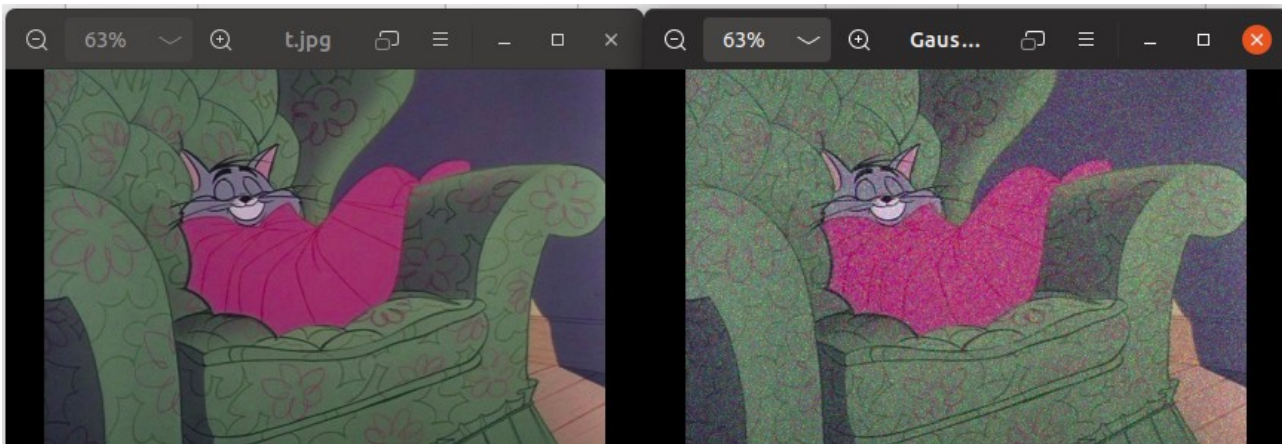
1. Salt & Pepper



2. Exponential



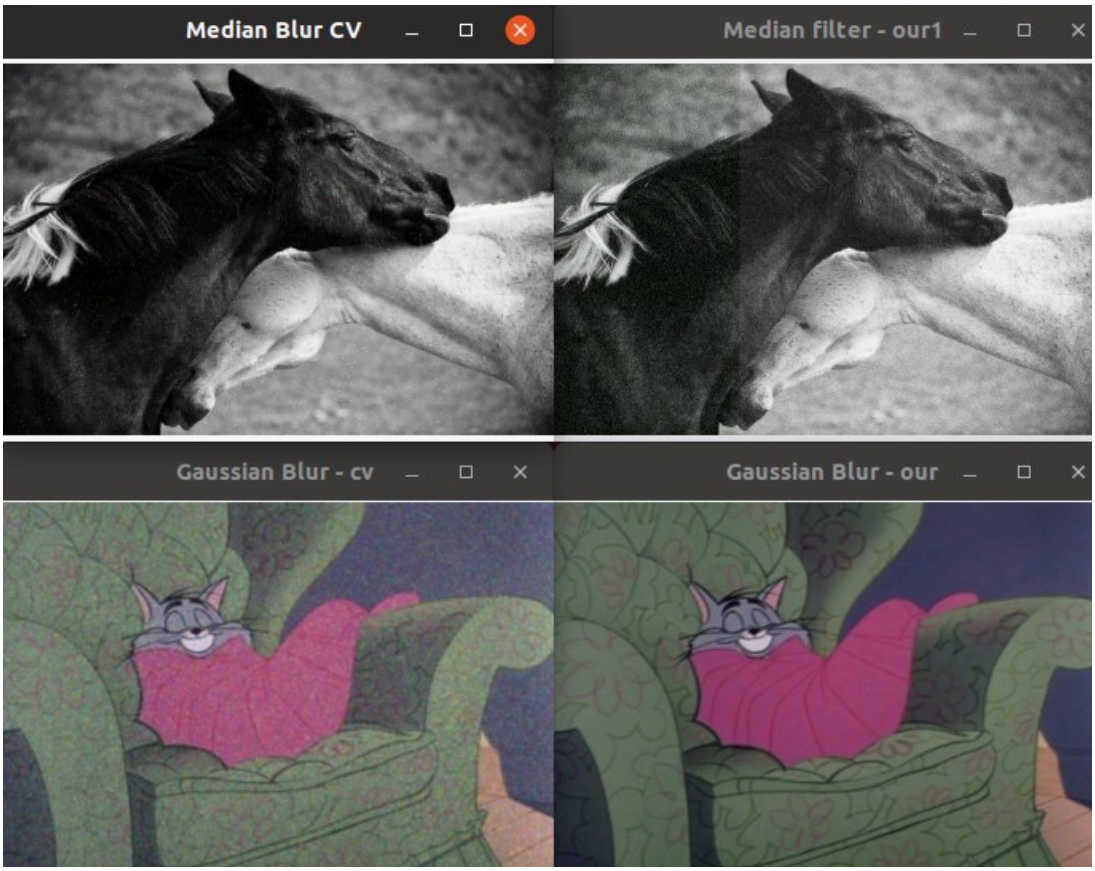
3. Gaussian



Filters :

1. Median filter

2. Gaussian blur



```
dariamityagina@dariamityagina-Inspiron-15-3552:~/cpp_test/laba2oi$ g++ main.cpp
-o app `pkg-config --cflags --libs opencv`
dariamityagina@dariamityagina-Inspiron-15-3552:~/cpp_test/laba2oi$ ./app
SSIM exp = 0.390658
SSIM sp = 0.018626
SSIM gauss = 0.682205

SSIM gauss f = 0.938175
SSIM median f = 0.0255403

SSIM gauss f cv = 0.97824
SSIM median f cv = 0.0355094

dariamityagina@dariamityagina-Inspiron-15-3552:~/cpp_test/laba2oi$
```