

```
mignotte@goldorak:~/.../TpIFT3205_Debruitage/prog$ ls -al
total 864
drwx----- 2 mignotte mignotte 4096 Aug  1 15:23 .
drwx----- 6 mignotte mignotte 4096 Jul 21 15:19 ..
-rwx----- 1 mignotte mignotte 105 Jul 21 15:19 compilegcc
-rwx----- 1 mignotte mignotte 12544 Jul 21 15:19 FonctionDemo5.c
-rwx----- 1 mignotte mignotte 1425 Jul 21 15:19 FonctionDemo5.h
-rw-rw-r-- 1 mignotte mignotte 15136 Aug  1 15:23 FonctionDemo5.o
-rwx----- 1 mignotte mignotte 262201 Aug  1 15:23 lena512_Degraded.pgm
-rwx----- 1 mignotte mignotte 262172 Jul 21 15:19 lena512.pgm
-rwx----- 1 mignotte mignotte 262201 Aug  1 15:23 lena512_Restored.pgm
-rwx----- 1 mignotte mignotte 1593 Jul 21 15:19 Mail IFT3205 Debruita
-rwxrwxr-x 1 mignotte mignotte 22447 Aug  1 15:23 Tp5 IFT3205 2-1
-rwx----- 1 mignotte mignotte 4830 Jul 21 15:19 Tp5_IFT3205_2-1.c
mignotte@goldorak:~/.../TpIFT3205_Debruitage/prog$ ./compilegcc Tp5_IFT3
```

```
compilation du programme Tp5 IFT3205 2-1.c
mignotte@goldorak:~/.../TpIFT3205_Debruitage/prog$ ./Tp5_IFT3205_2-1
--> Ouverture de lena512.pgm
```

```
--Entete--
-----
P5
#lena512.pbm
512 512
255
```

```
Info Noise
-----
> MSE = [874.79]
Sauvegarde de lena512_Degraded au format pgm

Sauvegarde de lena512_Restored au format pgm

> display lena512.pgm&
> display lena512_Degraded.pgm&
> display lena512_Restored.pgm&
C'est fini...
mignotte@goldorak:~/.../TpIFT3205_Debruitage/prog$
```

ImageMagick: lena512.pgm

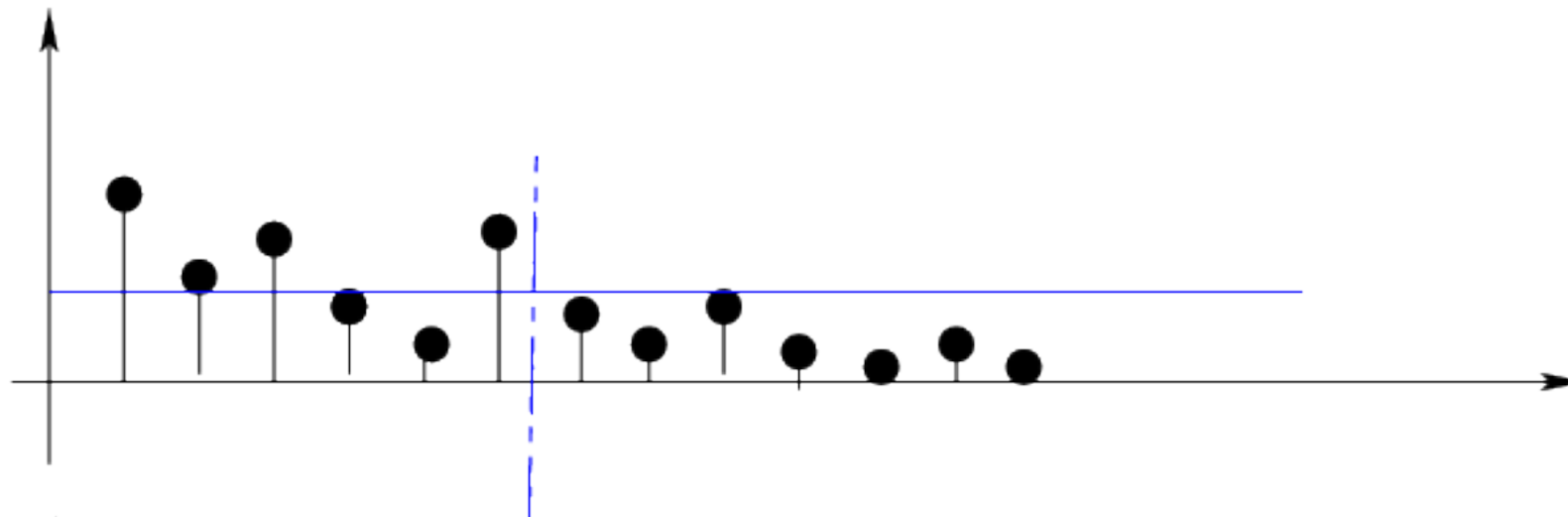
ImageMagick: lena512_Restored.pgm

ImageMagick: lena512_Degraded.pgm

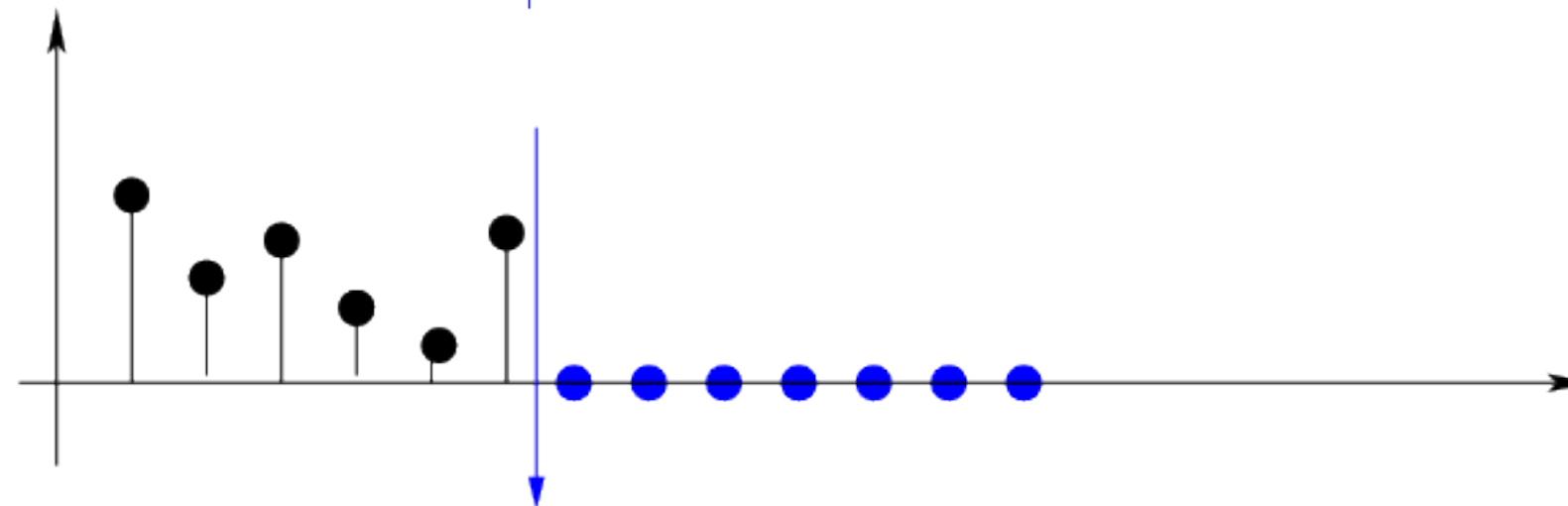


Debruitage

Signal

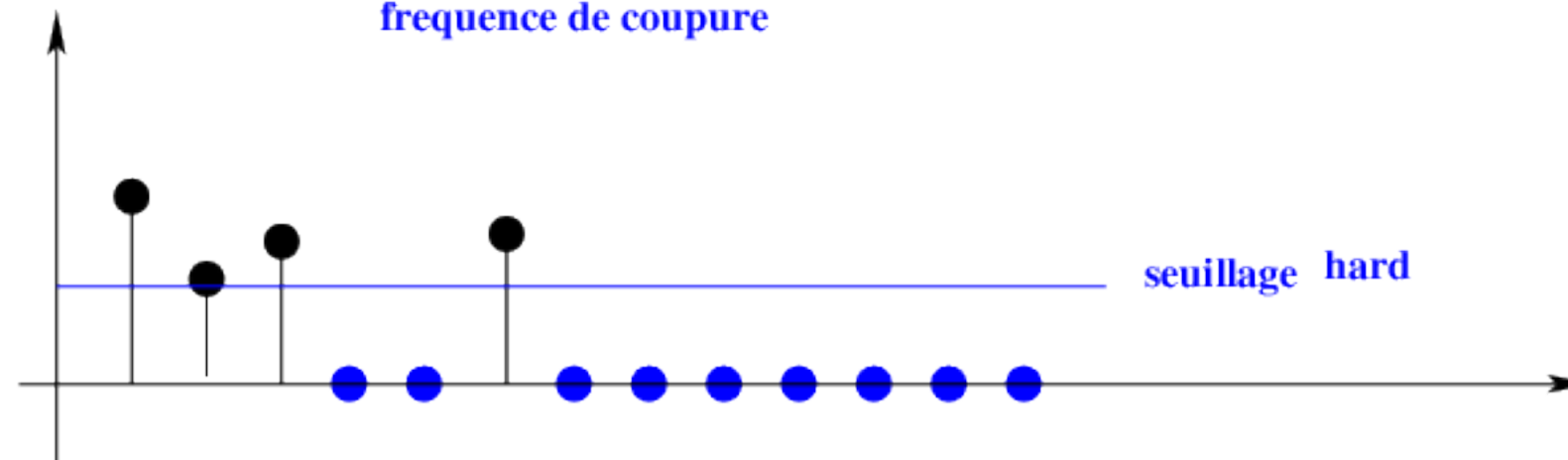


Passe-Bas



frequence de coupure

Seuillage Hard




```
-rwx----- 1 mignotte mignotte 11280 Aug 1 16:02 Tp5_IFT3205.c~
```

```
mignotte@goldorak:~/.../TpIFT3205
```

```
mignotte@goldorak:~/.../TpIFT3205
```

```
compilation du programme Tp5_IFT
```

```
mignotte@goldorak:~/.../TpIFT3205
```

```
---> Ouverture de lena512.pgm
```

```
--Entete--
```

```
-----
```

```
P5
```

```
#lena512.pbm
```

```
512 512
```

```
255
```

```
Info Noise
```

```
-----
```

```
> MSE = [874.79]
```

```
-----
```

```
IterDctDenoise
```

```
-----
```

```
Length:Width [512][512]
```

```
-----
```

```
>> SigmaNoise = [30]
```

```
-----
```

```
Threshold_Dct > [6]
```

```
Size Window > [8]
```

```
Overlap > [8]
```

```
> MSE >> [157.00185]
```

```
Sauvegarde de lena512_Degraded
```

```
Sauvegarde de lena512_Restored
```

```
> display lena512.pgm&
```

```
> display lena512_Degraded.pgm&
```

```
> display lena512_Restored.pgm&
```

```
C'est fini...
```

```
mignotte@goldorak:~/.../TpIFT3205_Debruitage/solution$
```



mignotte@goldorak: ~/.../TpIFT3205_Debuitage/solution

mignotte@goldorak: ~/.../TpIFT3205_Debuitage/solution 184x42

```
-rwx----- 1 mignotte mignotte 11156 Aug 1 16:12 Tp5 IFT3205.c
-rwx----- 1 mignotte mignotte
mignotte@goldorak:~/.../TpIFT32
mignotte@goldorak:~/.../TpIFT32
```

```
compilation du programme Tp5 IF
mignotte@goldorak:~/.../TpIFT32
--> Ouverture de lena512.pgm
```

```
--Entete--
-----
P5
#lena512.pbm
512 512
255
```

```
Info Noise
-----
> MSE = [874.79]
-----
IterDctDenoise
-----
Length:Width [512][512]
-----
>> SigmaNoise = [30]
-----
Threshold Dct > [100]
Size Window > [8]
Overlap > [8]

> MSE >> [140.28267]
Sauvegarde de lena512_Degraded
Sauvegarde de lena512_Restored

> display lena512.pgm&
> display lena512_Degraded.pgm&
> display lena512_Restored.pgm&
C'est fini...
mignotte@goldorak:~/.../TpIFT3205_Debuitage/solution$
```

ImageMagick: lena512.pgm



ImageMagick: lena512_Degraded.pgm

ImageMagick: lena512_Restored.pgm



Algorithm 1
Débruitage à base de DCT locale

Initialisation

 $\hat{f} \leftarrow g$

Débruitage par DCT

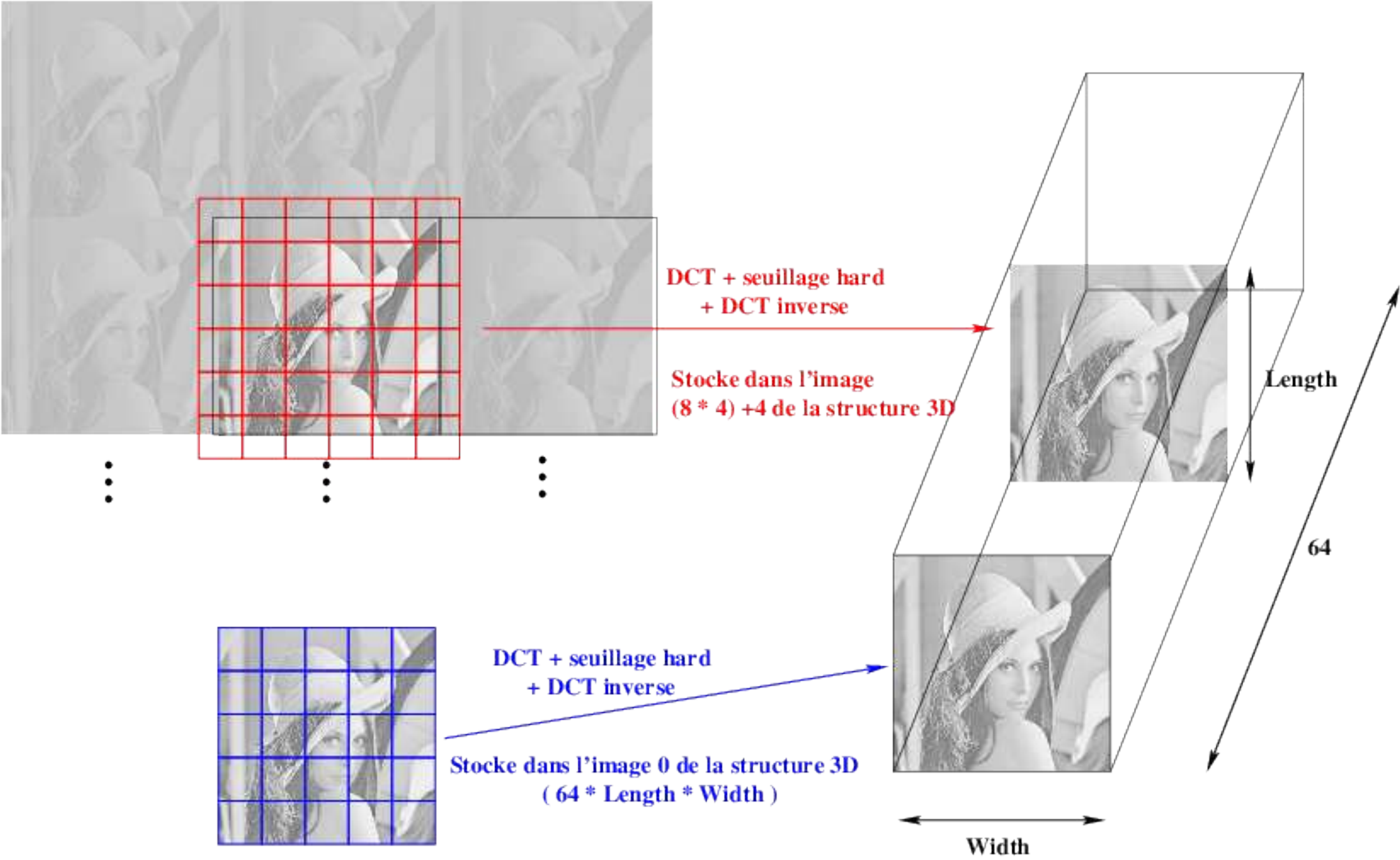
for tous les décalage (8 horiz. and 8 vert.) de $\hat{f}$ do

 for tous les blocks $[8 \times 8]$ extraits de $\hat{f}$ do

1. Calcule la TCD
2. Seuil les coefficients TCD c_n avec la règle
$$\begin{cases} 0 & \text{si } |c_n| \leq T \\ c_n & \text{autrement} \end{cases}$$
3. Calcule la TCD^{-1} de ces coef. seuillés

 ▷ Décalage inverse de l'image filtrée et stocke la

$\hat{f} \leftarrow$ Moyennage de ces 64 images débruitées




```
-rwxrwxr-x 1 mignotte mignot  
-rwx----- 1 mignotte mignot  
-rwx----- 1 mignotte mignot  
mignotte@goldorak:~/.../TpIF
```

```
compilation du programme Tp5  
mignotte@goldorak:~/.../TpIF  
--> Ouverture de lena512.pg
```

```
--Entete--  
-----  
P5  
#lena512.pbm  
512 512  
255
```

```
Info Noise  
-----  
> MSE = [874.79]  
-----  
IterDctDenoise  
-----  
Length:Width [512][512]  
-----  
>> SigmaNoise = [30]  
-----  
Threshold_Dct > [90]  
Size Window > [8]  
Overlap > [1]  
  
> MSE >> [65.04538]  
Sauvegarde de lena512_Degra  
  
Sauvegarde de lena512_Resto
```

```
> display lena512.pgm&  
> display lena512_Degraded.pgm&  
> display lena512_Restored.pgm&  
C'est fini...
```

```
mignotte@goldorak:~/.../TpIFT3205_Debuitage/solution$
```

ImageMagick: lena512.pgm



ImageMagick: lena512_Degraded.pgm



ImageMagick: lena512_Restored.pgm



Complement au TP

**En utilisant cinq iterations de l'Algorithme precedent avec
un seuil de DCT egal a 30, on obtient une restauration
de l'image lena avec un $MSE = 58.06$**


```
compilation du programme Tp
mignotte@goldorak:~/.../TpI
---> Ouverture de lena512.p
```

```
--Entete--
```

```
-----
P5
#lena512.pbm
512 512
255
```

```
Info Noise
```

```
-----
> MSE = [874.79]
```

```
-----
IterDctDenoise
```

```
-----
Length:Width [512][512]
```

```
-----
>> SigmaNoise = [30]
```

```
-----
Threshold_Dct > [30]
```

```
Size Window > [8]
```

```
Overlap > [1]
```

```
> MSE >> [582.92804]
```

```
> MSE >> [316.66937]
```

```
> MSE >> [127.32987]
```

```
> MSE >> [62.56534]
```

```
> MSE >> [58.06257]
```

```
Sauvegarde de lena512_Degr
```

```
Sauvegarde de lena512_Rest
```

```
> display lena512.pgm&
```

```
> display lena512_Degraded.pgm&
```

```
> display lena512_Restored.pgm&
```

```
C'est fini...
```

```
mignotte@goldorak:~/.../TpIFT3205_Debruitage/solution$
```

ImageMagick: lena512.pgm



ImageMagick: lena512_Degraded.pgm



ImageMagick: lena512_Restored.pgm

