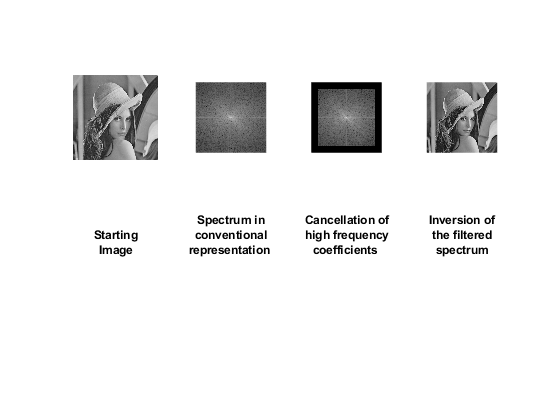
TP 1 : Spectral characterization

# I. Frequency filtering

1) 2)

Voici les 3 images que l'on obtient après les diverses transformations et filtrage.

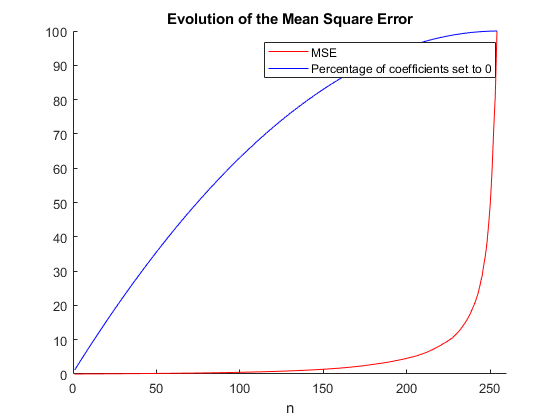


L'erreur quadratique moyenne entre l'image de base et l'image après la transformé inverse est la suivante :

rmse = 3.1142

3)

Le graphe sur l'évolution de l'erreur moyenne quadratique est le suivant:



# II. Characterization

1)

On commence par établir pour chaque image dans notre base un vecteur de caractéristiques caractérisant la texture. On obtient la matrice 50x18 suivante (pour 50 images et 18 zones prédéfinies ou feature)

1.0e+04 \*

Columns 1 through 12

1.8629 0.9761 1.0080 1.0234 0.9963 1.8775 0.9594 0.5016 0.5445 0.5576 0.5239 0.9805

1.7688 0.9667 1.0251 1.0250 0.9702 1.7741 0.9485 0.5172 0.5611 0.5688 0.5194 0.9466

1.6397 0.9515 1.0632 1.0904 0.9622 1.6519 0.8538 0.4913 0.5564 0.5696 0.4989 0.8575

1.7532 0.9663 1.0854 1.0648 0.9613 1.7490 0.9187 0.5135 0.5839 0.5714 0.5075 0.9229

1.7132 0.8150 0.8531 0.8908 0.8658 1.7724 0.9515 0.4353 0.4443 0.4854 0.4811 1.0034

1.6978 0.7964 0.8094 0.8254 0.8344 1.7474 0.9431 0.4161 0.4301 0.4705 0.4932 1.0393

1.6428 0.8009 0.7941 0.8005 0.7933 1.6077 1.0070 0.4738 0.4342 0.4296 0.4271 0.9146

1.9649 0.9742 0.9514 0.9380 0.9793 1.9702 1.0146 0.5040 0.4800 0.4950 0.5232 1.0200

1.9409 0.9723 0.9597 0.9412 0.9412 1.9098 0.9964 0.5021 0.4888 0.4765 0.4910 0.9904

1.7378 0.9086 0.9381 0.9445 0.9131 1.7265 0.9662 0.5129 0.5316 0.5358 0.5211 0.9604

1.7720 0.9304 0.9552 0.9671 0.9487 1.7804 0.9612 0.5197 0.5408 0.5520 0.5286 0.9701

1.9313 0.9903 1.0209 1.0355 1.0207 1.9721 1.0385 0.5442 0.5593 0.5808 0.5735 1.0740

1.7613 1.0161 1.0829 1.0746 1.0079 1.7592 0.9022 0.5223 0.5854 0.5823 0.5209 0.9013

1.6355 0.8942 0.9574 0.9325 0.8775 1.6585 0.8610 0.4702 0.5185 0.5072 0.5112 0.9196

1.6649 0.9137 0.9663 0.9607 0.9274 1.6977 0.8276 0.4696 0.5250 0.5363 0.5324 0.8322

1.2788 0.7272 0.8513 0.8709 0.7320 1.2917 0.7119 0.4114 0.4761 0.4890 0.4078 0.7209

1.5477 0.8645 0.9279 0.9445 0.8916 1.6033 0.8143 0.4618 0.5057 0.5227 0.4794 0.8375

1.8358 0.9458 0.9515 0.9475 0.9694 1.8007 0.9527 0.5601 0.5267 0.5266 0.4979 0.9182

1.7494 0.8955 0.8962 0.8995 0.8990 1.7589 0.8797 0.5172 0.5149 0.5070 0.5150 0.9141

1.5748 0.8616 0.9368 0.8929 0.8609 1.5840 0.8240 0.4255 0.4861 0.4715 0.4587 0.8695

1.6973 0.9164 0.9917 0.9990 0.9250 1.7204 0.9173 0.4882 0.5096 0.5213 0.5134 0.9795

1.7520 0.8757 0.9511 0.9872 0.9050 1.7853 0.9317 0.5017 0.5249 0.5539 0.5211 0.9726

1.6237 0.8632 0.9042 0.9017 0.8542 1.6168 0.9135 0.4948 0.5208 0.5112 0.4930 0.9060

1.6119 0.8713 0.9057 0.9030 0.8675 1.6036 0.9245 0.4956 0.5158 0.5127 0.4919 0.9040

1.7629 0.9126 0.9606 1.0056 0.9209 1.7757 0.9195 0.4818 0.5102 0.5431 0.4864 0.9209

1.9082 0.9934 1.0339 1.0245 0.9771 1.8881 0.9839 0.5291 0.5581 0.5494 0.5148 0.9628

1.6212 0.8941 0.9508 0.9760 0.8914 1.6155 0.8563 0.4591 0.4975 0.5146 0.4601 0.8603

1.8626 0.9586 0.9623 0.9624 0.9418 1.8515 0.9648 0.5027 0.5185 0.5134 0.5002 0.9644

1.1746 0.6700 0.7682 0.8008 0.6789 1.1895 0.6577 0.3792 0.4272 0.4513 0.3727 0.6680

1.6934 0.8758 0.8891 0.9082 0.8769 1.6917 0.8955 0.4786 0.4945 0.5048 0.4808 0.8993

1.5242 0.8158 0.8470 0.8572 0.8264 1.5204 0.8386 0.4608 0.4804 0.5023 0.4682 0.8606

1.8096 0.9450 0.9882 0.9939 0.9625 1.8326 0.9586 0.5090 0.5455 0.5470 0.5228 0.9853

1.5285 0.8088 0.8433 0.8533 0.8111 1.5349 0.8879 0.4610 0.4762 0.4842 0.4690 0.8953

1.5439 0.8627 0.9119 0.9122 0.8552 1.5299 0.8307 0.4869 0.5194 0.5147 0.4769 0.8182

1.6950 0.9261 0.9693 0.9573 0.9233 1.6938 0.8885 0.4933 0.5445 0.5401 0.4994 0.8901

1.7837 0.9365 0.9589 0.9465 0.9229 1.7769 0.9680 0.5161 0.5343 0.5211 0.5010 0.9607

1.5892 0.8792 0.9050 0.9028 0.8845 1.5987 0.8247 0.4872 0.5176 0.5200 0.4790 0.8474

1.4697 0.7664 0.7702 0.7786 0.7732 1.4584 0.8000 0.4202 0.4301 0.4531 0.4611 0.7944

1.7394 0.8838 0.9085 0.9174 0.8766 1.7237 0.9478 0.4811 0.4949 0.5034 0.4772 0.9327

1.7397 0.9081 0.9983 0.9956 0.8987 1.7346 0.9235 0.4980 0.5436 0.5361 0.4906 0.9288

1.7300 0.9055 0.9666 0.9680 0.9033 1.7192 0.9212 0.4985 0.5244 0.5286 0.5046 0.9468

1.7729 0.9524 0.9603 0.9817 0.9572 1.7829 0.9462 0.5065 0.5356 0.5454 0.5095 0.9579

1.6383 0.8702 0.9240 0.9536 0.8893 1.6527 0.9047 0.4793 0.5129 0.5330 0.4955 0.9106

1.4441 0.7804 0.8467 0.8774 0.8368 1.4306 0.8022 0.4269 0.4522 0.5002 0.4160 0.7446

1.3991 0.7750 0.8728 0.8991 0.7897 1.3850 0.7930 0.4277 0.4642 0.4921 0.4076 0.7506

1.4211 0.7904 0.8613 0.9063 0.8353 1.4289 0.7420 0.3953 0.4667 0.5082 0.4247 0.7440

1.3993 0.7978 0.8683 0.9107 0.8058 1.4078 0.7568 0.4180 0.4669 0.5058 0.4205 0.7504

1.6663 0.9105 1.0018 1.0063 0.9172 1.6965 0.8894 0.4797 0.5449 0.5475 0.5070 0.8885

1.8966 0.9713 1.0119 1.0056 0.9377 1.8154 0.9984 0.5163 0.5391 0.5362 0.4960 0.9449

1.7310 0.9179 1.0149 1.0042 0.9183 1.7186 0.9176 0.4985 0.5440 0.5376 0.4880 0.9156

Columns 13 through 18

0.9594 0.5016 0.5445 0.5576 0.5239 0.9805

0.9485 0.5172 0.5611 0.5688 0.5194 0.9466

0.8538 0.4913 0.5564 0.5696 0.4989 0.8575

0.9187 0.5135 0.5839 0.5714 0.5075 0.9229

0.9515 0.4353 0.4443 0.4854 0.4811 1.0034

0.9431 0.4161 0.4301 0.4705 0.4932 1.0393

1.0070 0.4738 0.4342 0.4296 0.4271 0.9146

1.0146 0.5040 0.4800 0.4950 0.5232 1.0200

0.9964 0.5021 0.4888 0.4765 0.4910 0.9904

0.9662 0.5129 0.5316 0.5358 0.5211 0.9604

0.9612 0.5197 0.5408 0.5520 0.5286 0.9701

1.0385 0.5442 0.5593 0.5808 0.5735 1.0740

0.9022 0.5223 0.5854 0.5823 0.5209 0.9013

0.8610 0.4702 0.5185 0.5072 0.5112 0.9196

0.8276 0.4696 0.5250 0.5363 0.5324 0.8322

0.7119 0.4114 0.4761 0.4890 0.4078 0.7209

0.8143 0.4618 0.5057 0.5227 0.4794 0.8375

0.9527 0.5601 0.5267 0.5266 0.4979 0.9182

0.8797 0.5172 0.5149 0.5070 0.5150 0.9141

0.8240 0.4255 0.4861 0.4715 0.4587 0.8695

0.9173 0.4882 0.5096 0.5213 0.5134 0.9795

0.9317 0.5017 0.5249 0.5539 0.5211 0.9726

0.9135 0.4948 0.5208 0.5112 0.4930 0.9060

0.9245 0.4956 0.5158 0.5127 0.4919 0.9040

0.9195 0.4818 0.5102 0.5431 0.4864 0.9209

0.9839 0.5291 0.5581 0.5494 0.5148 0.9628

0.8563 0.4591 0.4975 0.5146 0.4601 0.8603

0.9648 0.5027 0.5185 0.5134 0.5002 0.9644

0.6577 0.3792 0.4272 0.4513 0.3727 0.6680

0.8955 0.4786 0.4945 0.5048 0.4808 0.8993

0.8386 0.4608 0.4804 0.5023 0.4682 0.8606

0.9586 0.5090 0.5455 0.5470 0.5228 0.9853

0.8879 0.4610 0.4762 0.4842 0.4690 0.8953

0.8307 0.4869 0.5194 0.5147 0.4769 0.8182

0.8885 0.4933 0.5445 0.5401 0.4994 0.8901

0.9680 0.5161 0.5343 0.5211 0.5010 0.9607

0.8247 0.4872 0.5176 0.5200 0.4790 0.8474

0.8000 0.4202 0.4301 0.4531 0.4611 0.7944

0.9478 0.4811 0.4949 0.5034 0.4772 0.9327

0.9235 0.4980 0.5436 0.5361 0.4906 0.9288

0.9212 0.4985 0.5244 0.5286 0.5046 0.9468

0.9462 0.5065 0.5356 0.5454 0.5095 0.9579

0.9047 0.4793 0.5129 0.5330 0.4955 0.9106

0.8022 0.4269 0.4522 0.5002 0.4160 0.7446

0.7930 0.4277 0.4642 0.4921 0.4076 0.7506

0.7420 0.3953 0.4667 0.5082 0.4247 0.7440

0.7568 0.4180 0.4669 0.5058 0.4205 0.7504

0.8894 0.4797 0.5449 0.5475 0.5070 0.8885

0.9984 0.5163 0.5391 0.5362 0.4960 0.9449

0.9176 0.4985 0.5440 0.5376 0.4880 0.9156

On effectue un test de similarité sur toutes les images de notre base entre elles à l'aide de la distance Manhattan entre les vecteurs des images. L'image avec la distance la plus faible sera la plus ressemblante.

L image 1 resemble le plus a l image 32

L image 2 resemble le plus a l image 42

L image 3 resemble le plus a l image 48

L image 4 resemble le plus a l image 13

L image 5 resemble le plus a l image 6

L image 6 resemble le plus a l image 5

L image 7 resemble le plus a l image 33

L image 8 resemble le plus a l image 9

L image 9 resemble le plus a l image 8

L image 10 resemble le plus a l image 36

L image 11 resemble le plus a l image 42

L image 12 resemble le plus a l image 26

L image 13 resemble le plus a l image 4

L image 14 resemble le plus a l image 43

L image 15 resemble le plus a l image 35

L image 16 resemble le plus a l image 45

L image 17 resemble le plus a l image 37

L image 18 resemble le plus a l image 36

L image 19 resemble le plus a l image 30

L image 20 resemble le plus a l image 17

L image 21 resemble le plus a l image 41

L image 22 resemble le plus a l image 42

L image 23 resemble le plus a l image 24

L image 24 resemble le plus a l image 23

L image 25 resemble le plus a l image 50

L image 26 resemble le plus a l image 1

L image 27 resemble le plus a l image 17

L image 28 resemble le plus a l image 36

L image 29 resemble le plus a l image 16

L image 30 resemble le plus a l image 39

L image 31 resemble le plus a l image 33

L image 32 resemble le plus a l image 1

L image 33 resemble le plus a l image 31

L image 34 resemble le plus a l image 37

L image 35 resemble le plus a l image 48

L image 36 resemble le plus a l image 42

L image 37 resemble le plus a l image 17

L image 38 resemble le plus a l image 44

L image 39 resemble le plus a l image 30

L image 40 resemble le plus a l image 50

L image 41 resemble le plus a l image 40

L image 42 resemble le plus a l image 11

L image 43 resemble le plus a l image 23

L image 44 resemble le plus a l image 45

L image 45 resemble le plus a l image 47

L image 46 resemble le plus a l image 47

L image 47 resemble le plus a l image 46

L image 48 resemble le plus a l image 35

L image 49 resemble le plus a l image 26

L image 50 resemble le plus a l image 40