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##############################################################################
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Image compression problem: use one of the grayscale images provided to construct several compressed versions of the image (k=5, 25, 50).
Report the compresssion factor in each case (by looking at the size of the files).

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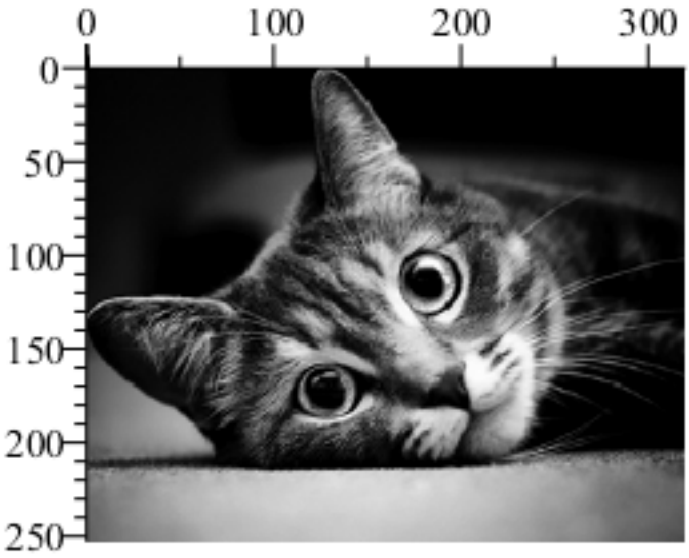
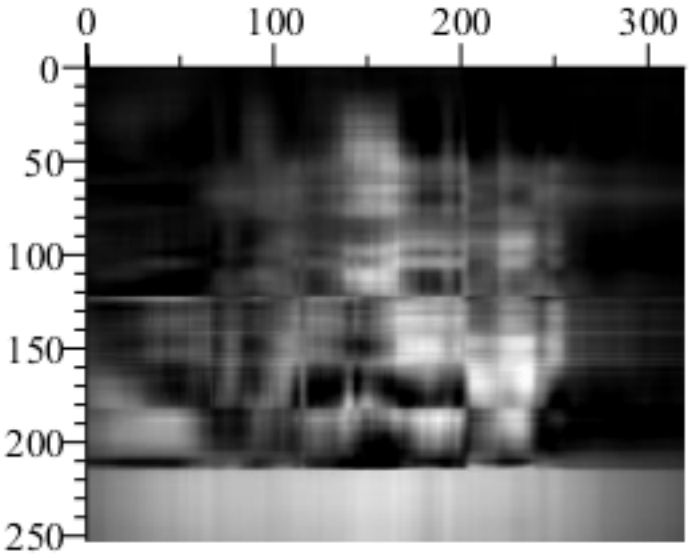
##############################################################################
> restart; with(LinearAlgebra) : with(ImageTools) :
> cat1 := Read("cat.jpg") :
> Preview(cat1); matrixcat := convert(cat1, Matrix);
```



$$matrixcat := \begin{bmatrix} 253 \text{ x } 320 \text{ Matrix} \\ \text{Data Type: } float_8 \\ \text{Storage: rectangular} \\ \text{Order: C\_order} \end{bmatrix} \quad \textbf{(1)}$$

```
> cat_5 := Read("cat_5.jpg") : Preview(cat_5); matrixcat := convert(cat_5, Matrix);
```



$$matrixcat := \begin{bmatrix} 253 \text{ x } 320 \text{ Matrix} \\ \text{Data Type: } float_8 \\ \text{Storage: rectangular} \\ \text{Order: C\_order} \end{bmatrix} \quad \textbf{(2)}$$

##

svdimage with k=1..5 used to create cat_5.jpg size 8 KB cat_25.jpg=12 KB cat_50=13 KB original image cat.jpg size 61 KB

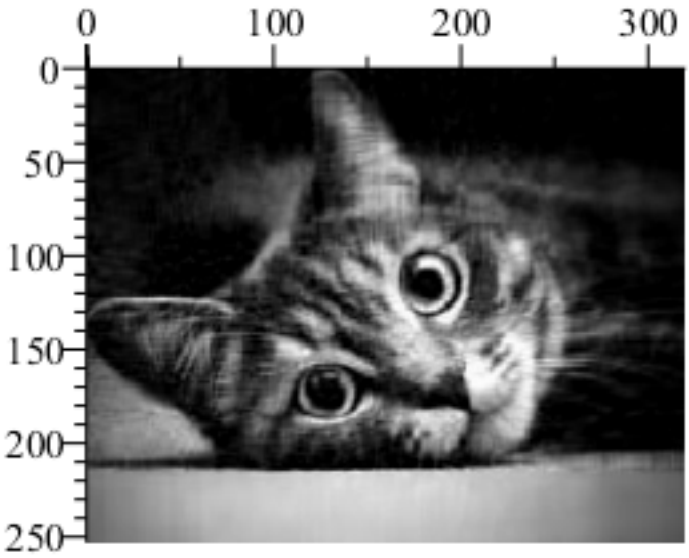
> $original\_size := 61 ; cat\_5\_size := 8; compression\_factor\_cat\_5 := evalf\left(\frac{original\_size}{cat\_5\_size}\right)$

$$original\_size := 61$$

$$cat\_5\_size := 8$$

$$\textbf{\textit{compression\_factor\_cat\_5}} := \textbf{7.625000000} \quad \textbf{(3)}$$

```
##############################################################################
> cat_25 := Read("cat_25.jpg") : Preview(cat_25); matrixcat := convert(cat_25, Matrix);
```



$$matrixcat := \begin{bmatrix} 253 \text{ x } 320 \text{ Matrix} \\ \text{Data Type: } float_8 \\ \text{Storage: rectangular} \\ \text{Order: C\_order} \end{bmatrix} \quad \textbf{(4)}$$

```
> original_size := 61 ; cat_25_size := 12; compression_factor_cat_25 := evalf( original_size / cat_25_size )
```

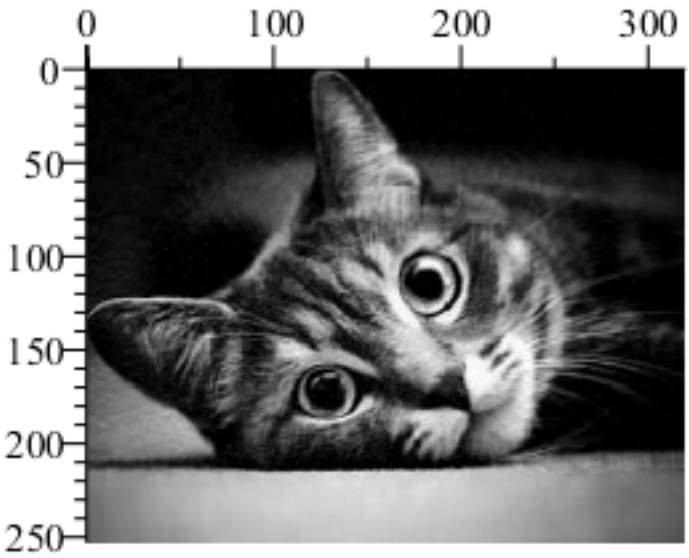
$$original\_size := 61$$

$$cat\_25\_size := 12$$

$$\textbf{compression\_factor\_cat\_25} := \textbf{5.083333333} \quad \textbf{(5)}$$

```
##############################################################################
> cat_50 := Read("cat_50.jpg"); Preview(cat_50); matrixcat := convert(cat_50, Matrix)
```

$$cat\_50 := \begin{bmatrix} 1..253 \text{ x } 1..320 \text{ Array} \\ \text{Data Type: } float_8 \\ \text{Storage: rectangular} \\ \text{Order: C\_order} \end{bmatrix}$$



$$matrixcat := \begin{bmatrix} 253 \text{ x } 320 \text{ Matrix} \\ \text{Data Type: } float_8 \\ \text{Storage: rectangular} \\ \text{Order: C\_order} \end{bmatrix} \quad \textbf{(6)}$$

> $original\_size := 61 ; cat\_50\_size := 13; compression\_factor\_cat\_50 := evalf\left(\frac{original\_size}{cat\_50\_size}\right)$

$$original\_size := 61$$
$$cat\_50\_size := 13$$
$$\textbf{\textit{compression\_factor\_cat\_50}} := \textbf{4.692307692} \quad \textbf{(7)}$$

>