直方图均衡化

对于离散值：$p_r(r_k)=\frac{n_k}{n}$

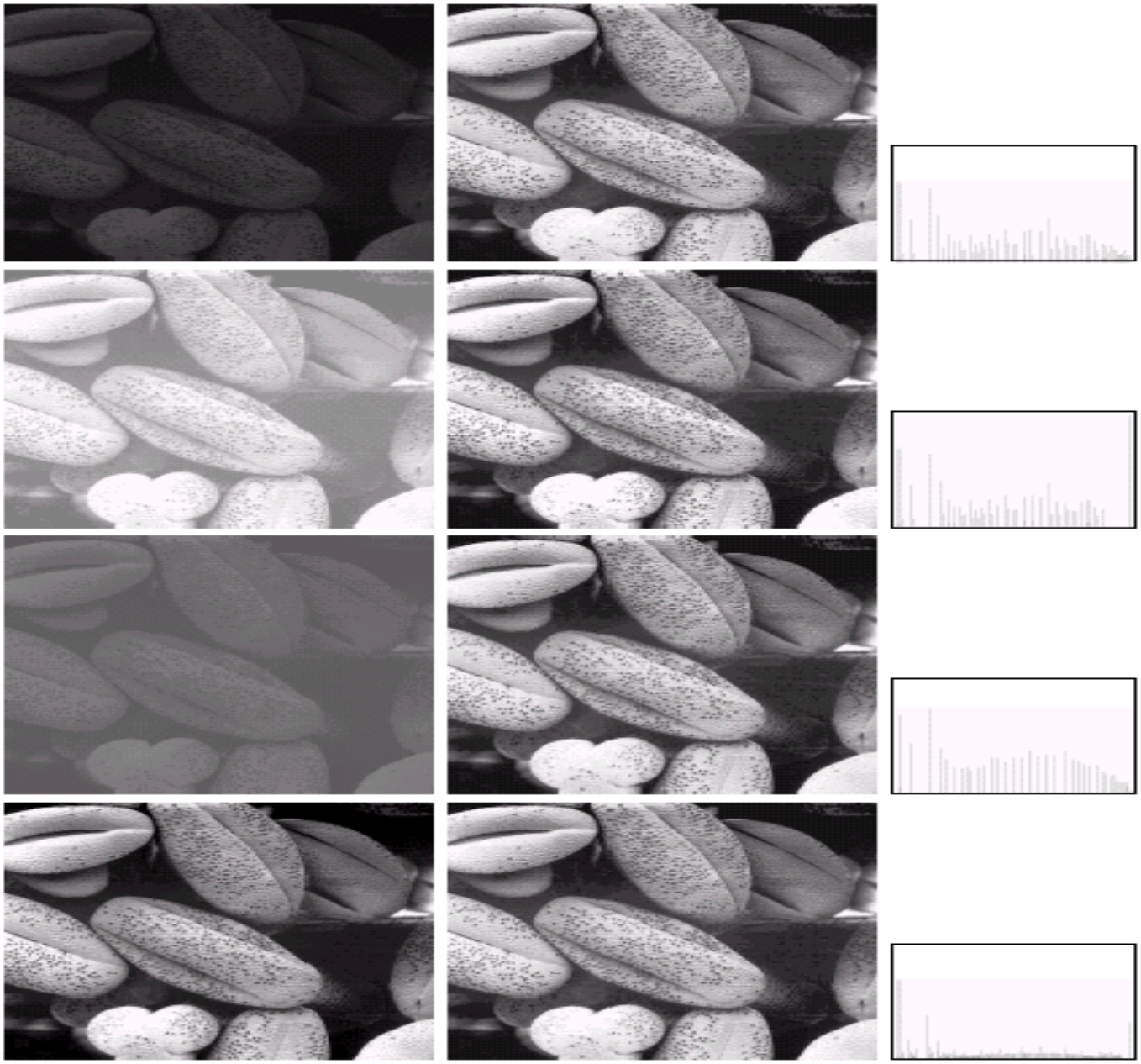
已知变换函数的离散形式为：

$$s_k = T(r_k)=\sum_{j=0}^{k} p_r(r_j)=\sum_{j=0}^{k}\frac{n_j}{n}$$

$$k=0, 1, 2, \ldots, L-1$$

s_k称作直方图均衡化

将输入图像中灰度级为r_k（横坐标）的像素映射到输出图像中灰度级为s_k（横坐标）的对应像素得到



Histogram Equalisation

Spreading out the frequencies in an image (or equalising the image) is a simple way to improve dark or washed out images

The formula for histogram equalisation is given where

- r_k: input intensity
- s_k: processed intensity
- k: the intensity range (e.g 0.0 – 1.0)
- n_j: the frequency of intensity j
- n: the sum of all frequencies

$$s_k = T(r_k)$$
$$= \sum_{j=1}^{k} p_r(r_j)$$
$$= \sum_{j=1}^{k} \frac{n_j}{n}$$

Example

Logarithmic Transformations

The general form of the log transformation is

$$s = c * log(1 + r)$$

The log transformation maps a narrow range of low input grey level values into a wider range of output values

The inverse log transformation performs the opposite transformation

Power Law Transformations

Power law transformations have the following form

$$s = c * r^{\gamma}$$

Map a narrow range of dark input values into a wider range of output values or vice versa

Varying γ gives a whole family of curves