Histogram equalization

Formula:

$$s_k = (L - 1) \sum_{i=0}^{k} p_r(r_i) \qquad \text{for k = 0, 1, 2, ... , L - 1}$$

Where,

$$p_r(r_k) = \frac{n_k}{MN}$$

n_k = total number of values with intensity r_k in the input image

M, N = number of rows and columns of the input image

This formula satisfies all three conditions of transformation function T(r) for histogram equalization which are,

- T(r) is a monotonic increasing function in the interval 0 <= r <= L - 1
- 0 <= T(r) <= L - 1 for 0 <= r <= L - 1
- T(r) is strictly monotonic increasing function in the interval 0 <= r <= L - 1