$S = L-1$

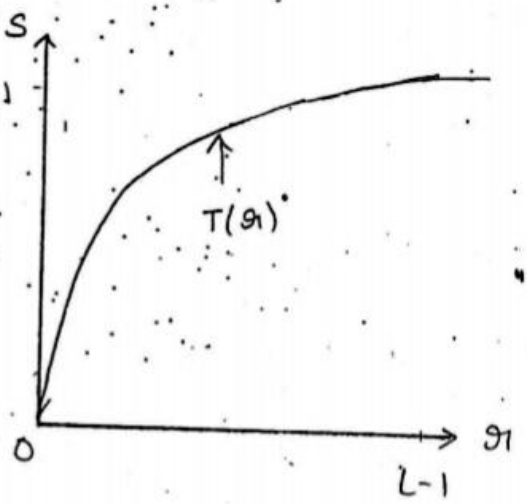
* Log transformation :-

The general form of log transformation is expressed as

$$S = T(r) = c \log(1+r)$$

where c is constant & it is assumed that $r \geq 0$.

The shape of the log curve shows that this transformation maps a narrow range of low gray-level values in the i/p image into a wider range of o/p levels.



The log transformation has the important characteristic of compressing the dynamic range of images with large variations in pixel values.

* POWER LAW TRANSFORMATION :-

Power law transformations have the basic form

$$S = cr^{\gamma} \quad \text{—— (1)}$$

where c & γ are positive constants.

The above eqn can also be written as

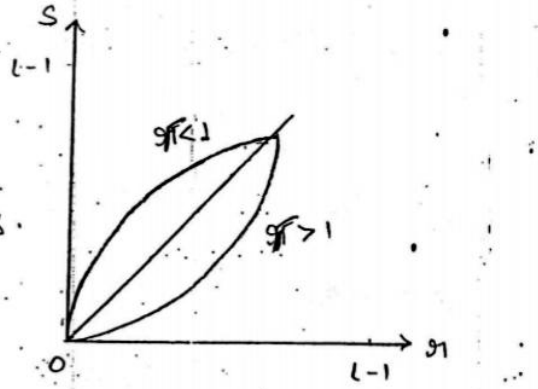
$S = (r+\varepsilon)^{\gamma}$ for offset purpose (i.e., measurable o/p when the i/p is zero)

* Since gamma (γ) is used to correct the power law response phenomenon, it is known as gamma correction & this power law transformation is also known as GAMMA TRANSFORMATION.

From (1), if $r = s$ then original intensity levels of image = o/p intensity levels.

$r < 1$ for high intensities

$r > 1$ for low intensities.



Advantage :-

1. This law is used in variety of devices for image capturing, printing & display responding purpose.
2. Used for Gamma correction.
3. power-law transformations are useful for general purpose contrast manipulations.

Applications of power law transformations are,

1. To capture an image
2. To print an image
3. To display an image.