Image Enhancement

Purpose: Modify image to bring out features (hidden otherwise)

- Two kinds
  - Spatial domain
  - Frequency domain

Spatial filtering

$f(x,y)$ = input.

$g(x,y)$ = enhanced img. = output.

Spare domain power: Trafo rule T

$$T[f(x,y)] = g(x,y)$$

T can be ~~either~~ either only a fn of (x,y) pixel in f, or neighboring pixels in f around (x,y)

Simple case : T 1X1 → Gray level Transfer

T . looks at single pixel in f(x,y)
determine g at (x,y).

$S = T(r)$

output pixel at (x,y)

input pixel at (x,y)

Skip 3.2 of B/W.

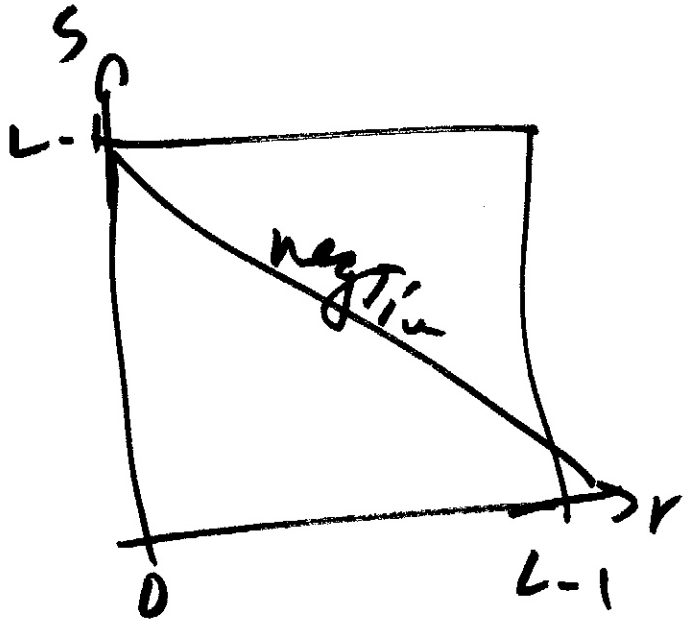
more complex

mask ← 3x3 region.
5x5
7x7

Gray level Transformation

① Image Negative:

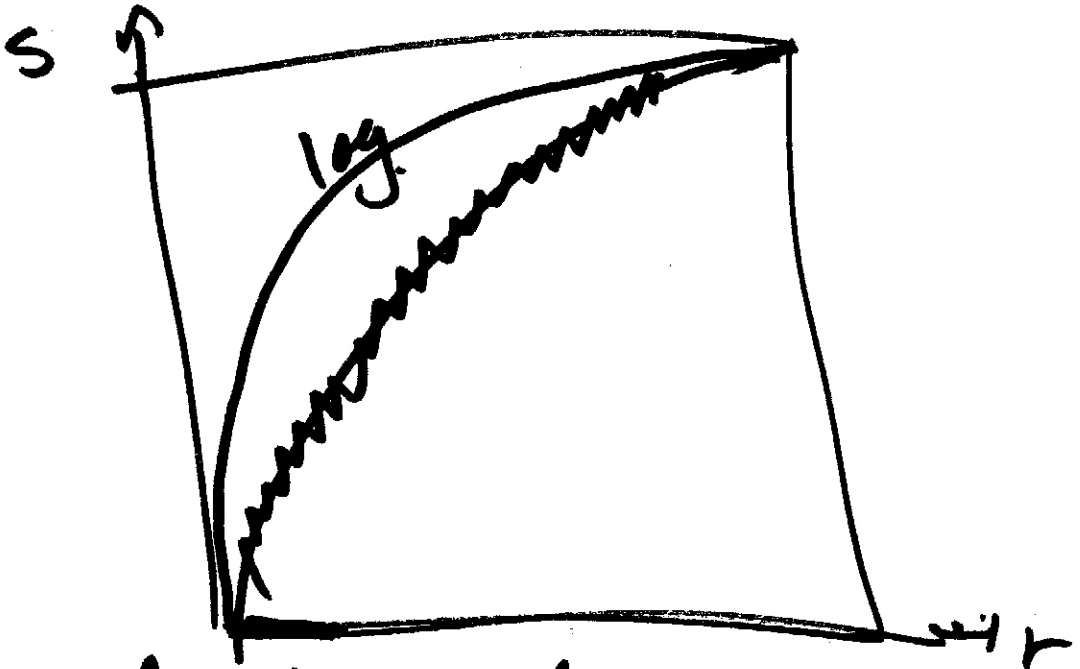
$$S = L - 1 - r$$



3.3 G/W

(2) Log Transformation:

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



- expand values of dark pixels → overall intensity.
- Compresses the dynamic range.

(3) Power-Law Transformation

$$S = C\, r^{\gamma}$$

C, γ are positive

Fig 3.6 in G/W

CRT = Cathode Ray Tube

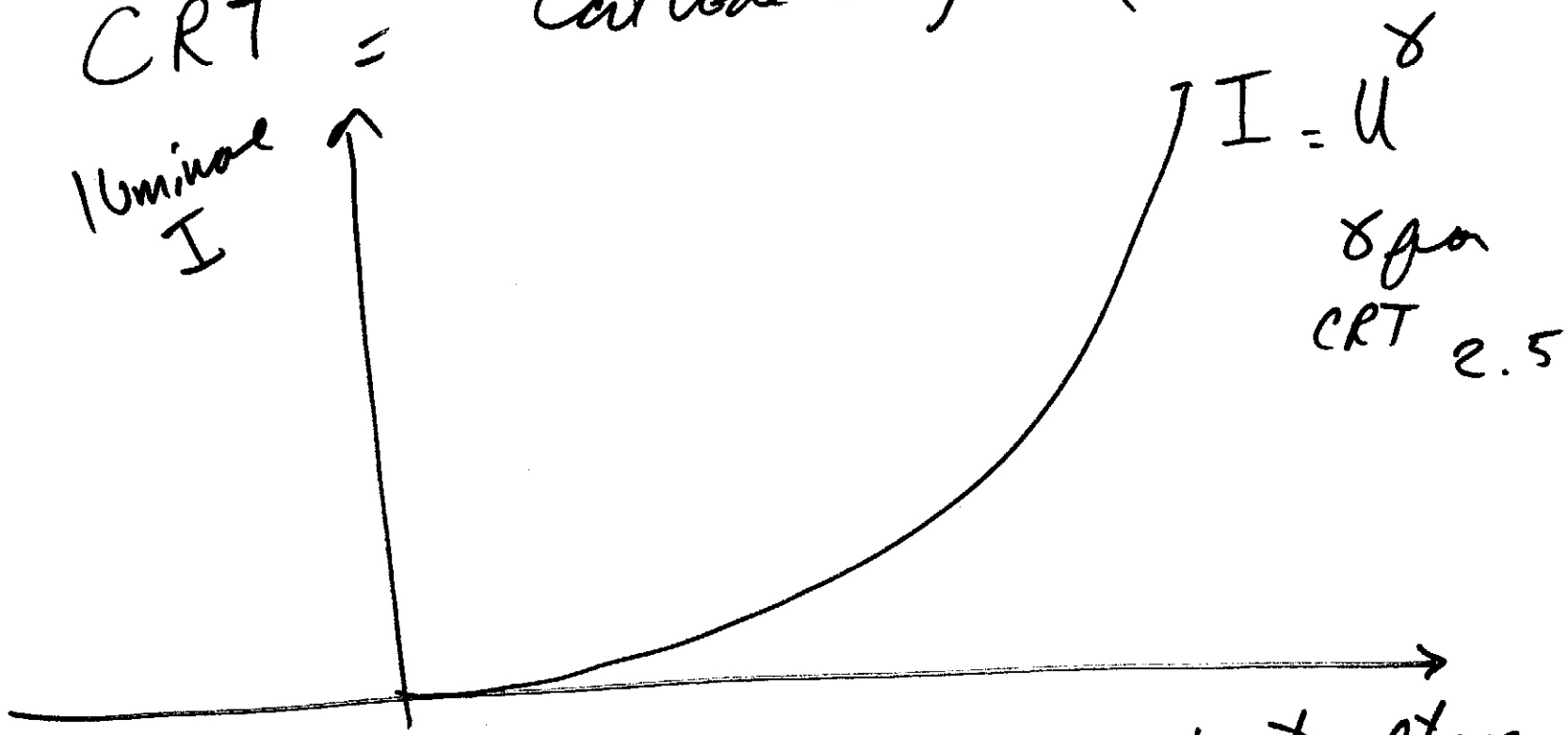


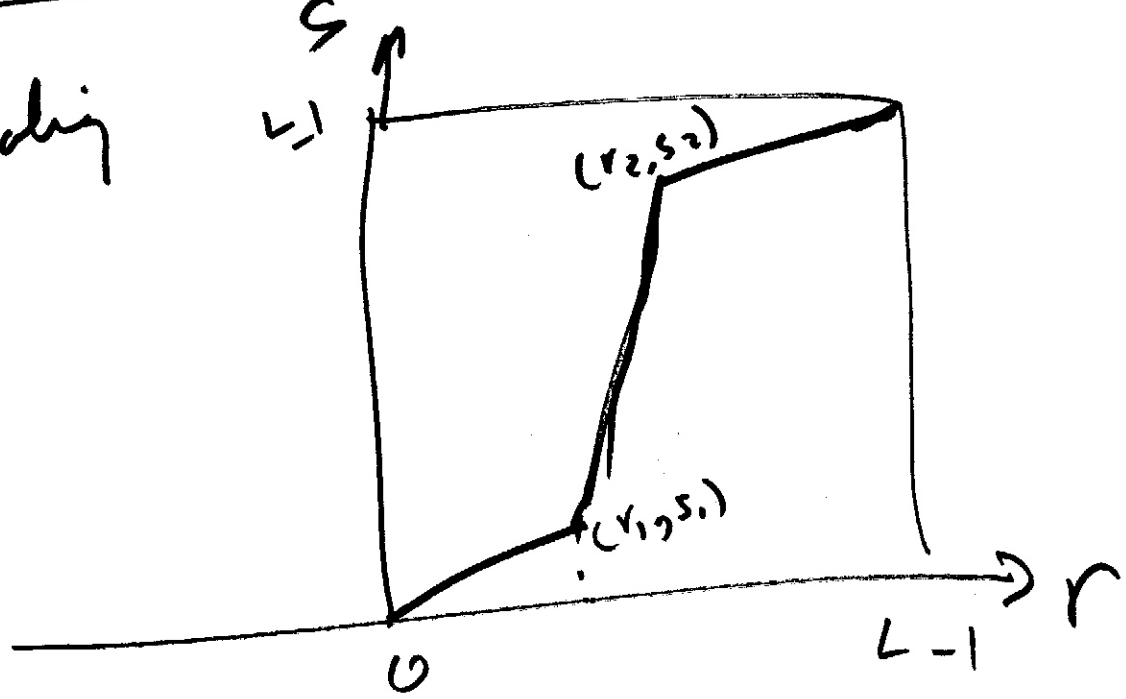
Fig 3.x GLW x:3.8 x:3.9

Correcting input image according to some power law so that it is rendered correctly in the output device gamma Correction

Piecewise Linear Transformation

① Contrast Stretching

3.10



② Gray level Slicing.

Histogram Processing

what is a histogram?