

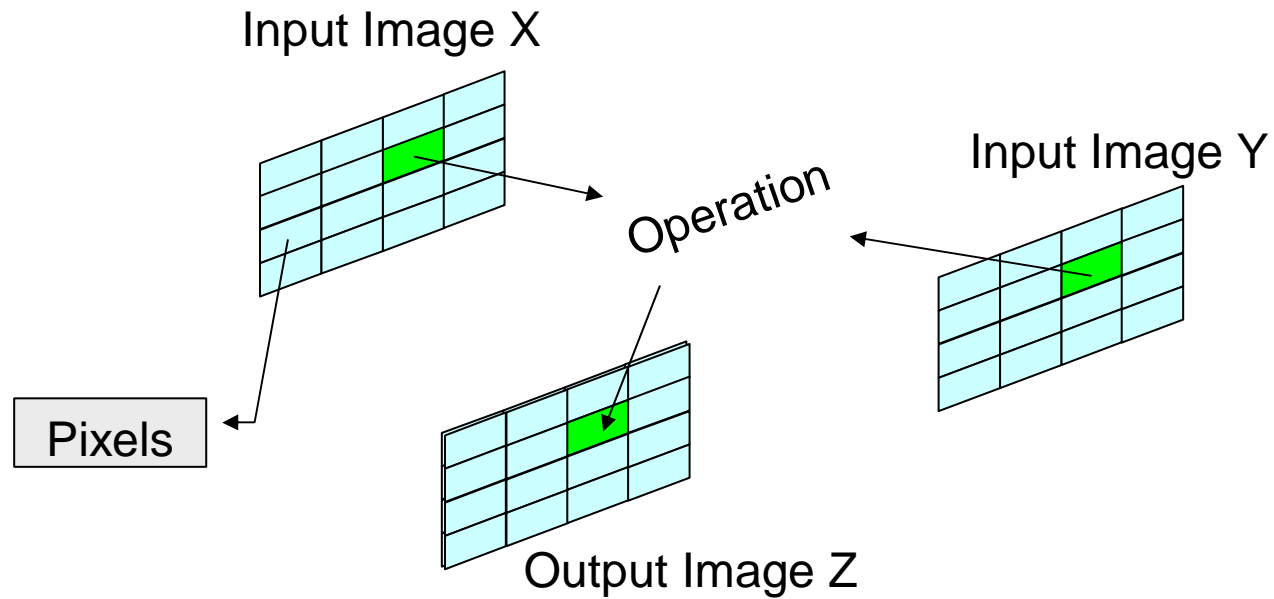
Image Enhancement Using Monomial Point Operations

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Point Operations on Images

- Point operations
 - Monomial
 - Negative Image, Brightness, Contrast, Gamma Correction, Log
 - Histogram
 - Binomial
 - Algebraic (add, subtract, multiply, divide) etc
 - Trinomial
 - Alpha blending, Chroma-Key

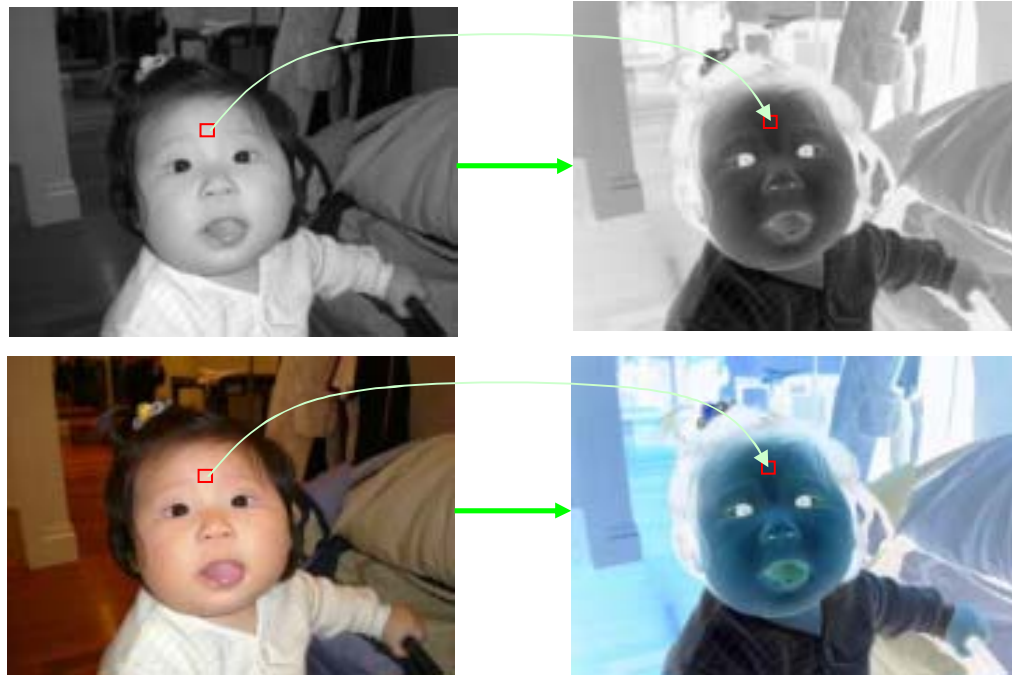
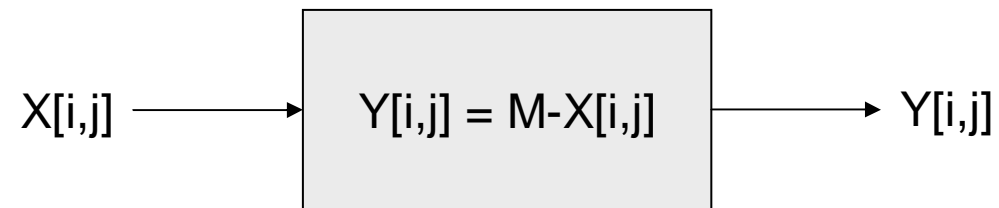
Concept of Point Operations



$$Z[i,j] = \text{Operation}(X[i,j], Y[i,j])$$

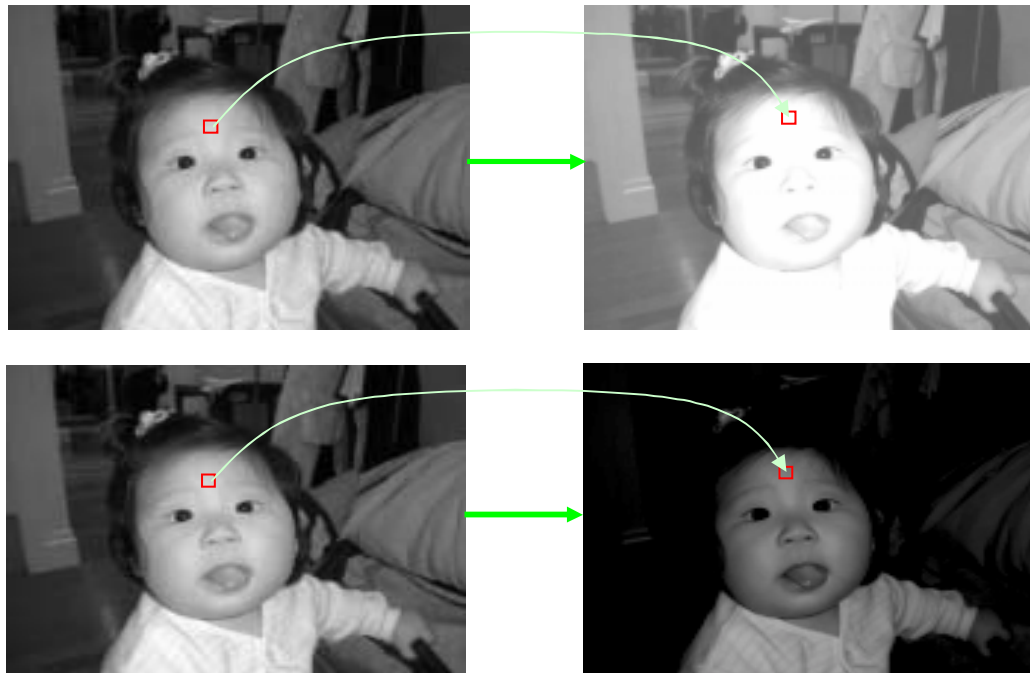
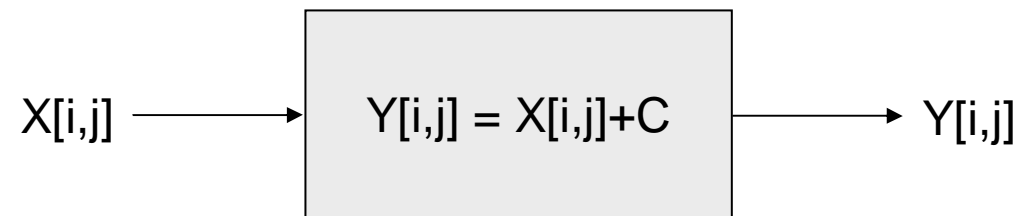
Negative Image

- Inverting each pixel



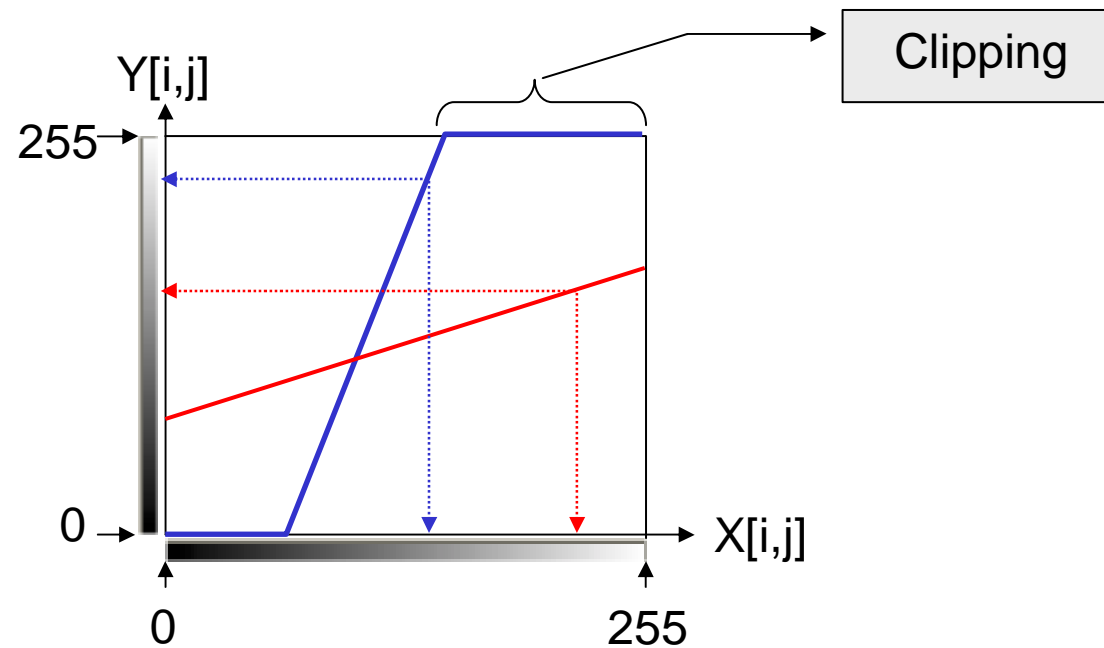
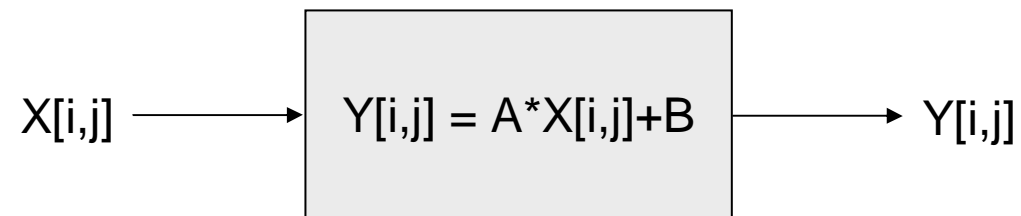
Brightness

- Biasing each pixel value

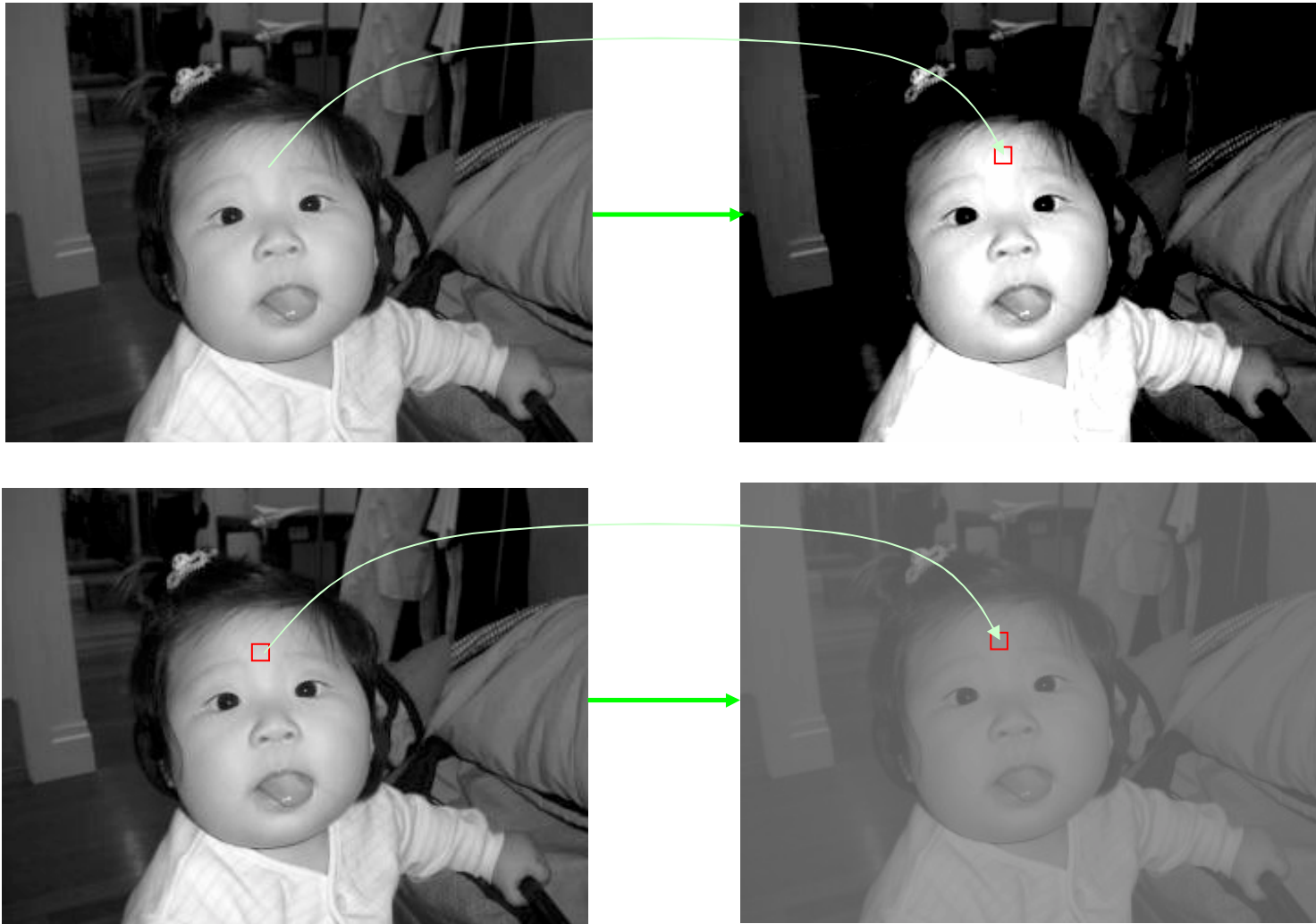


Contrast Enhancement

- Linear Operation

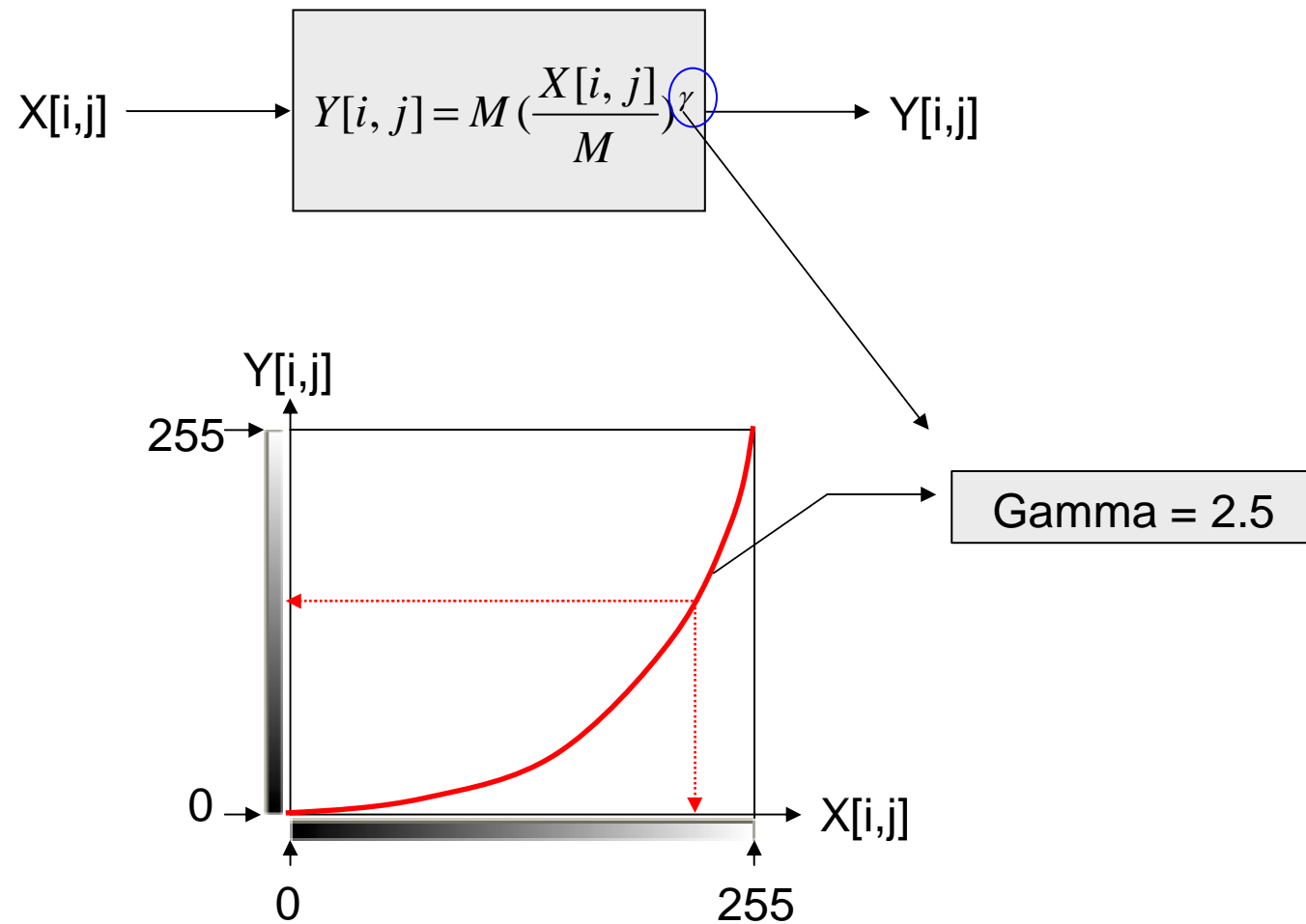


Contrast Enhancement



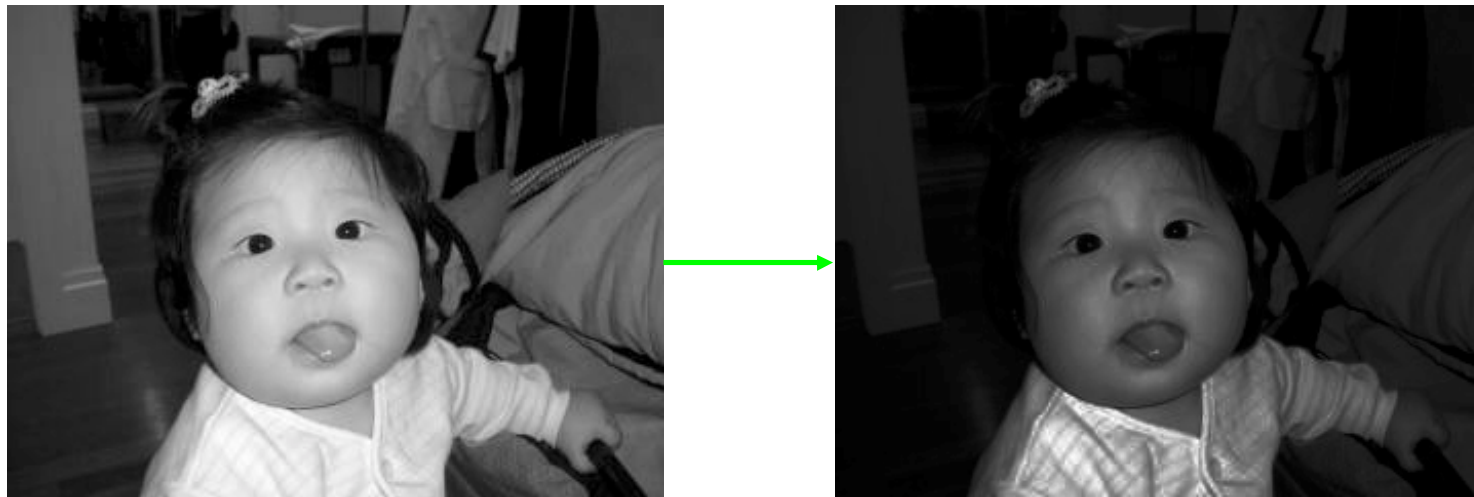
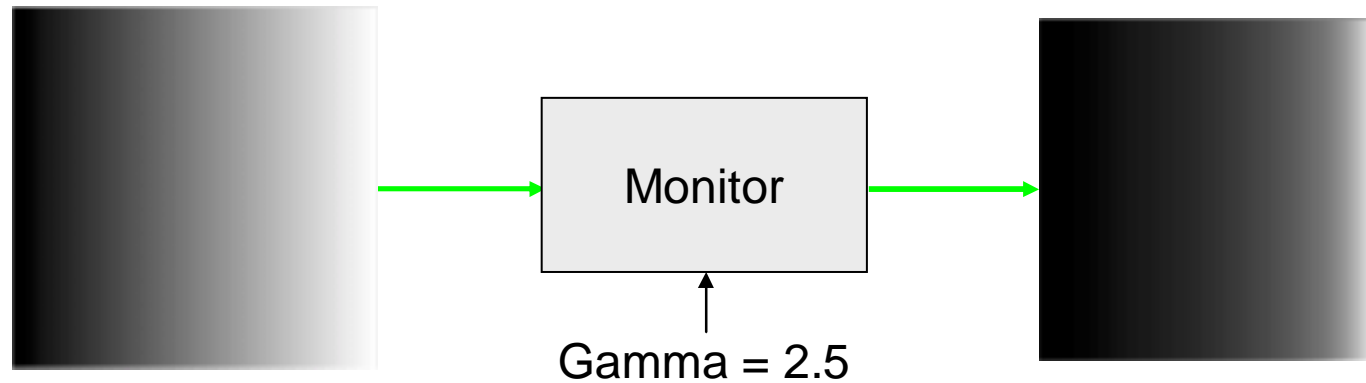
Gamma Correction

- Power-law transformations



Gamma Correction

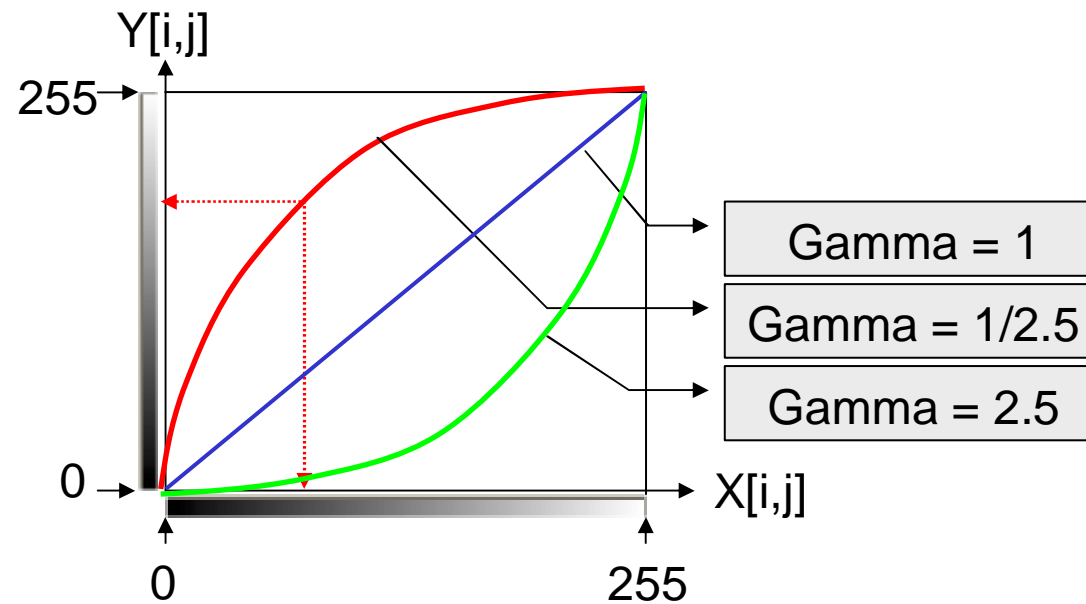
- Power-law operation in display device



Gamma Correction

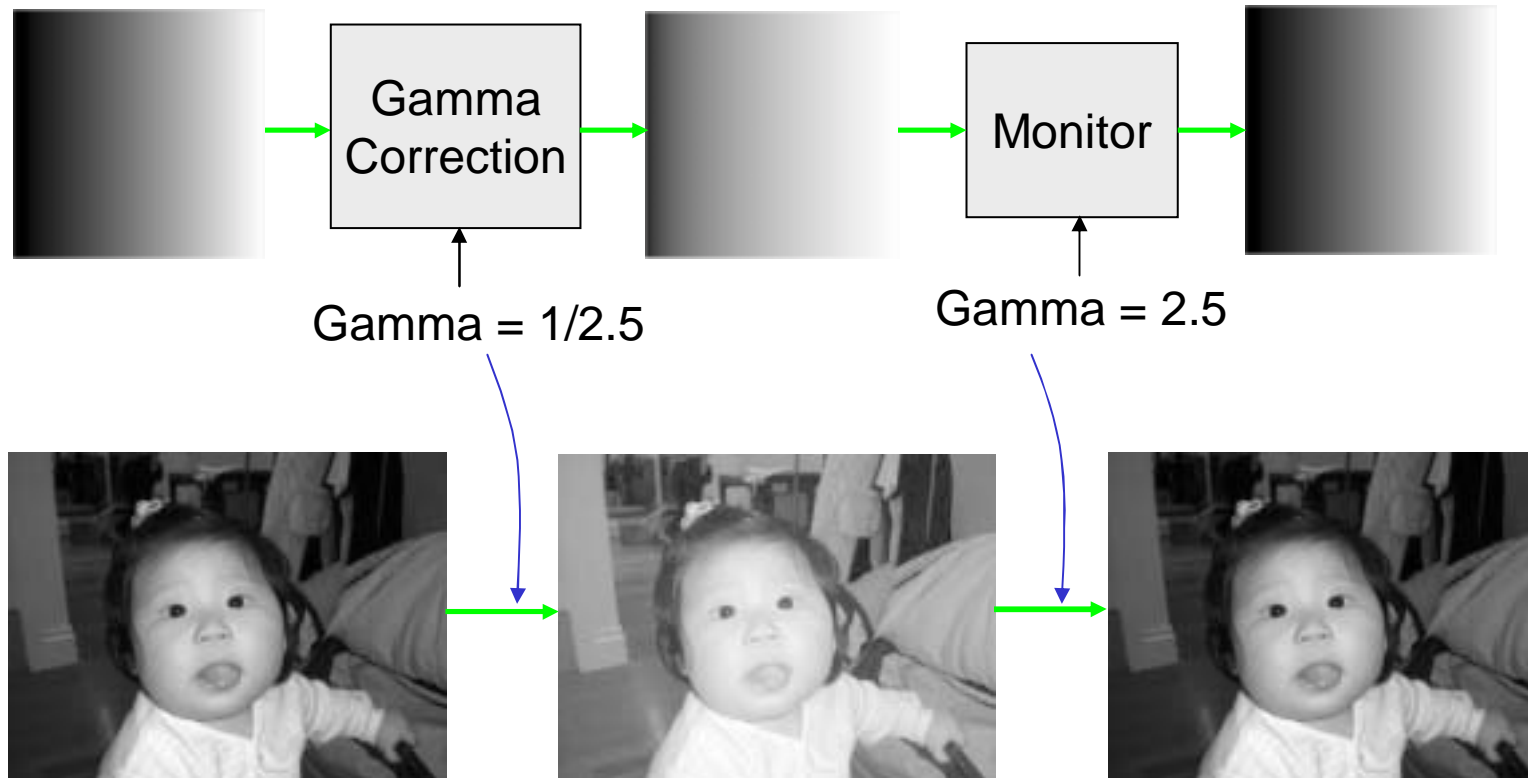
- Gamma correction

$$X[i,j] \longrightarrow Y[i,j] = M \left(\frac{X[i,j]}{M} \right)^\gamma \longrightarrow Y[i,j]$$



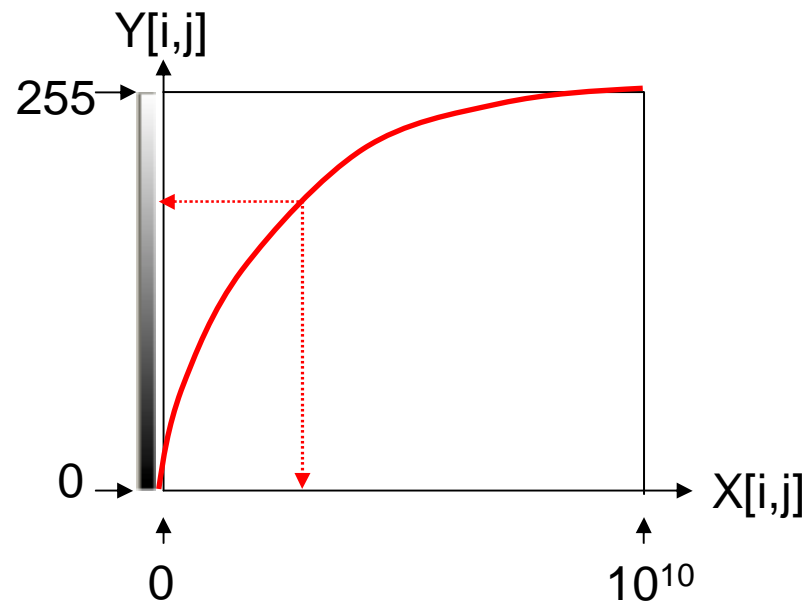
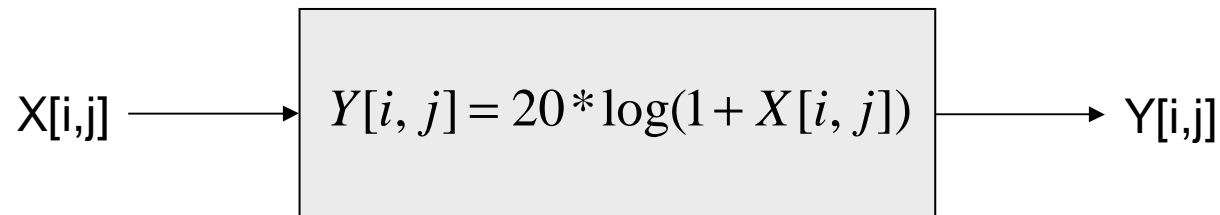
Gamma Correction

- Power-law operation in display device

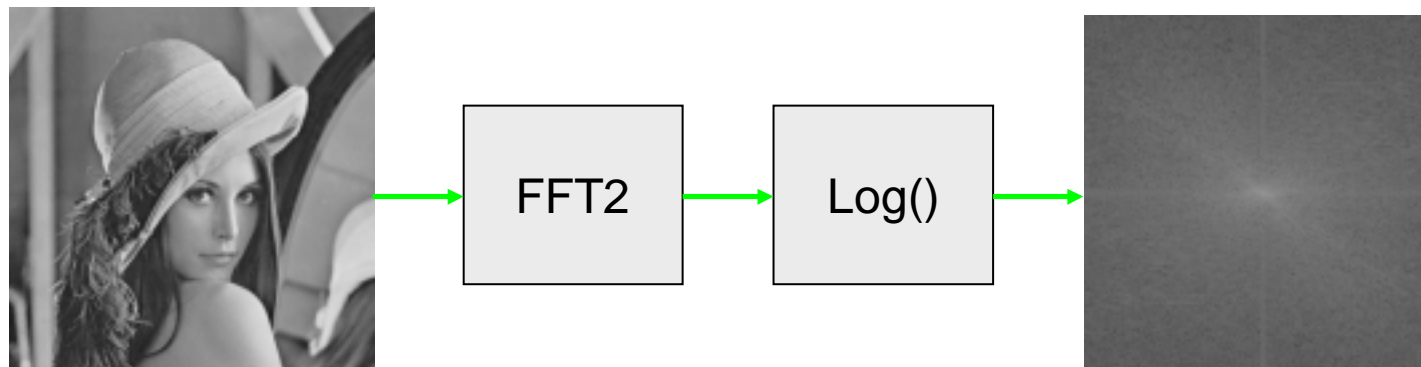
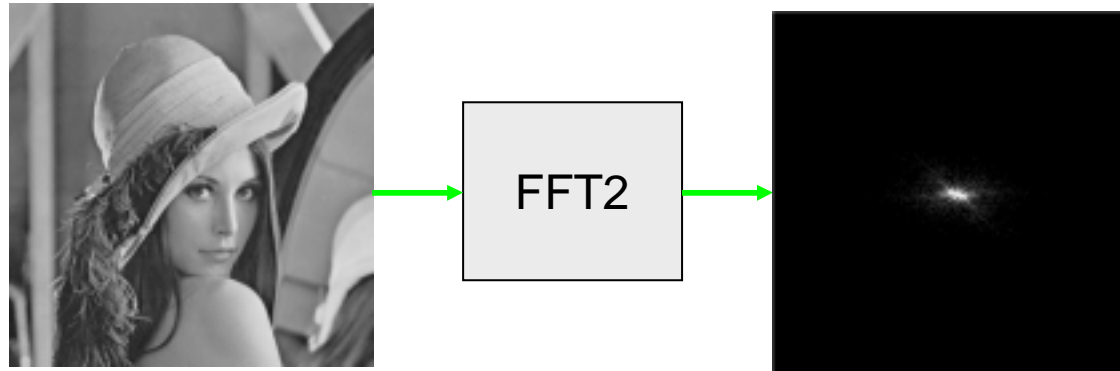


Log Operation

- Compressing the dynamic range of image pixels values



Log Operation



Summary

- Negative Image
- Brightness
- Contrast
- Gamma Correction
- Log operation