



INTERNATIONAL ATOMIC ENERGY AGENCY
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H4.SMR/383 - 21

**WORKSHOP ON REMOTE SENSING TECHNIQUES
WITH APPLICATIONS TO AGRICULTURE, WATER
AND WEATHER RESOURCES**

(27 February - 21 March 1989)

MULTISPECTRAL AND MULTIMAGE PROCESSING

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MULTISPECTRAL and MULTI-IMAGE
PROCESSING

IVAN PIPPI
CNR - IROE.
Florence - ITALY

IMAGE ADDITION

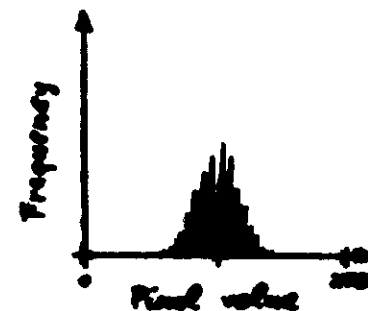
$$G(x,y) = F(x,y) + N(x,y)$$

$$G_{sum}(x,y) = \frac{G_1(x,y) + G_2(x,y)}{2}$$

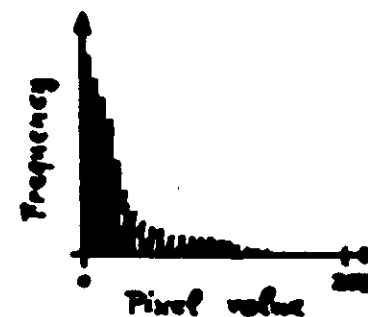
$$G'_{sum}(x,y) = \frac{G_1(x,y) + G_2(x,y) - 0}{D}$$

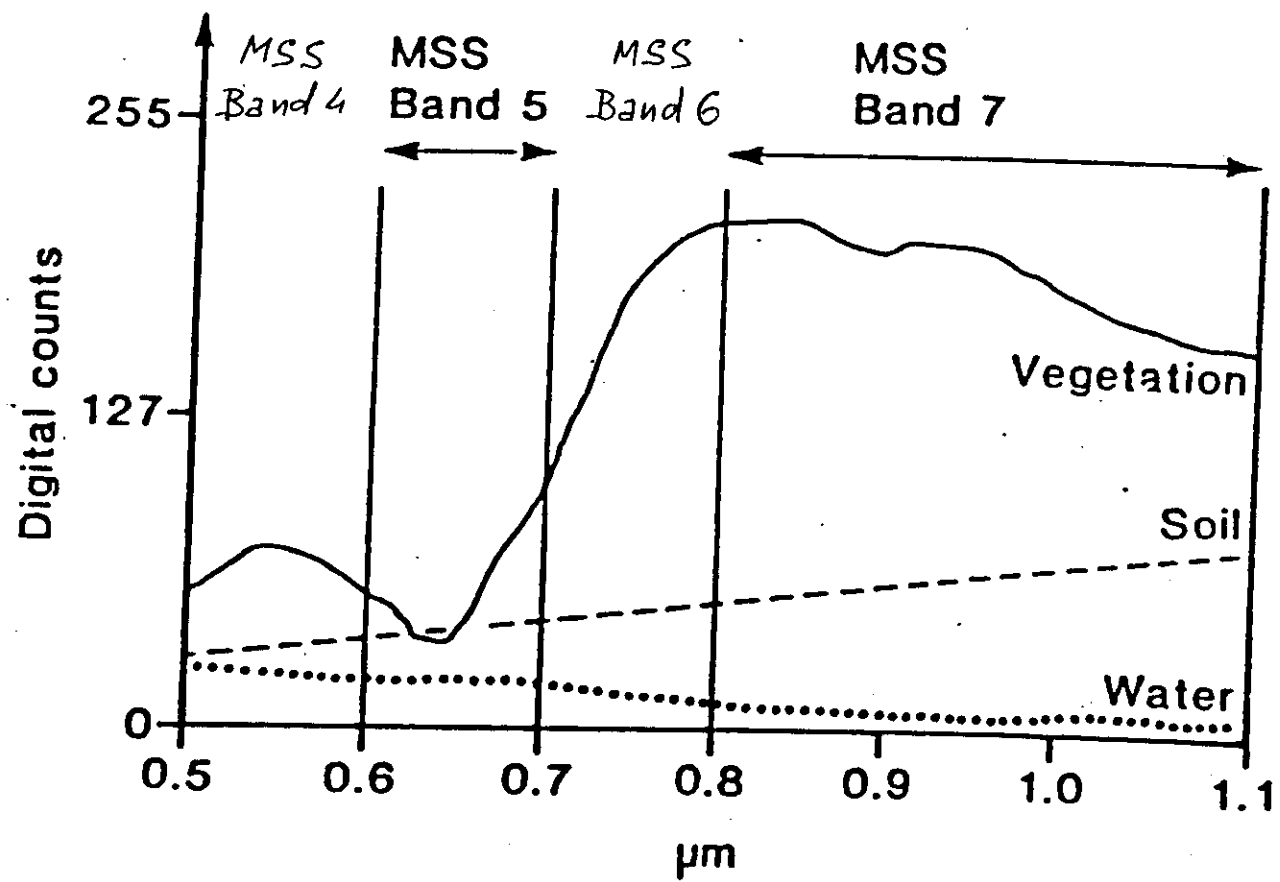
IMAGE SUBTRACTION

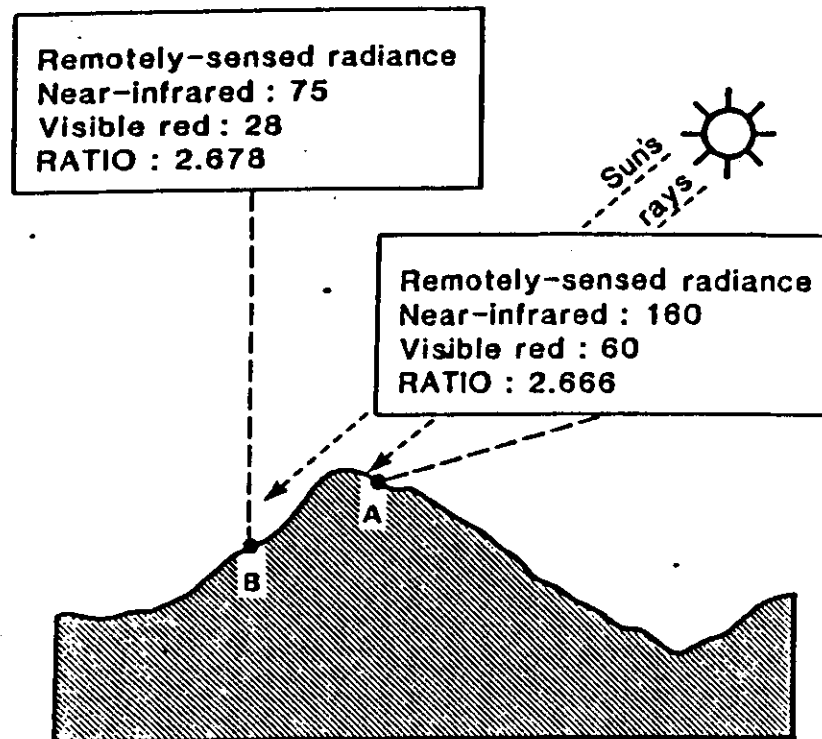
$$G_{\text{DIFF}}(x,y) = \frac{255 + G_1(x,y) - G_2(x,y)}{2}$$



$$G_{\text{AD}}(x,y) = |G_1(x,y) - G_2(x,y)|$$







$$R'(x,y) = \frac{R(x,y) - R_{\min}}{R_{\max} - R_{\min}} \cdot 255$$

One-pass approach:

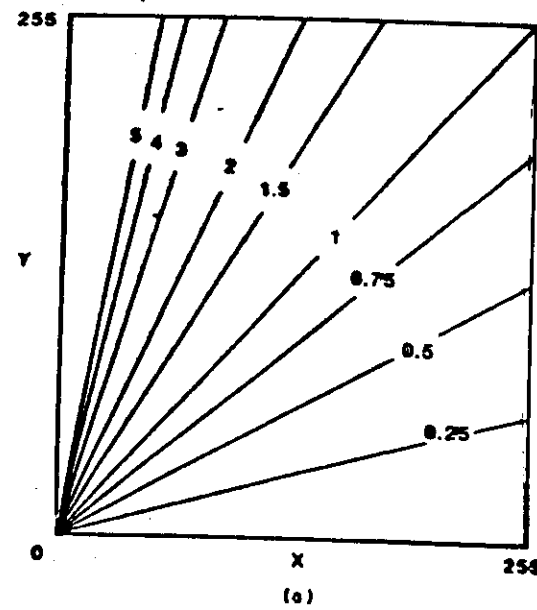
$$R'(x,y) = R(x,y) \cdot 127$$

$$R(x,y) \leq 1.$$

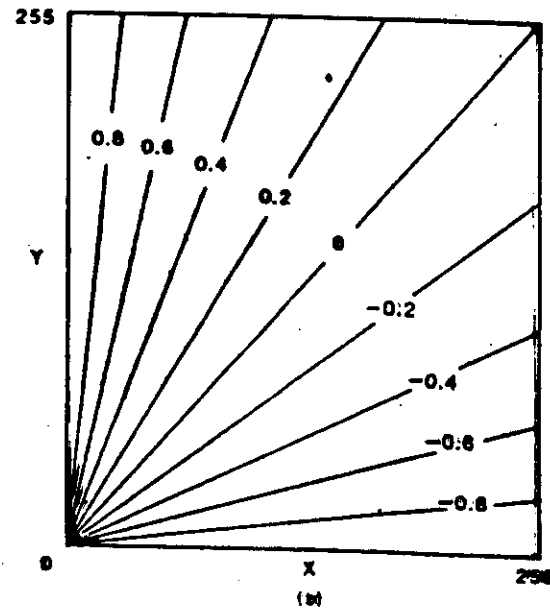
$$R'(x,y) = 255 - \frac{127}{R(x,y)}$$

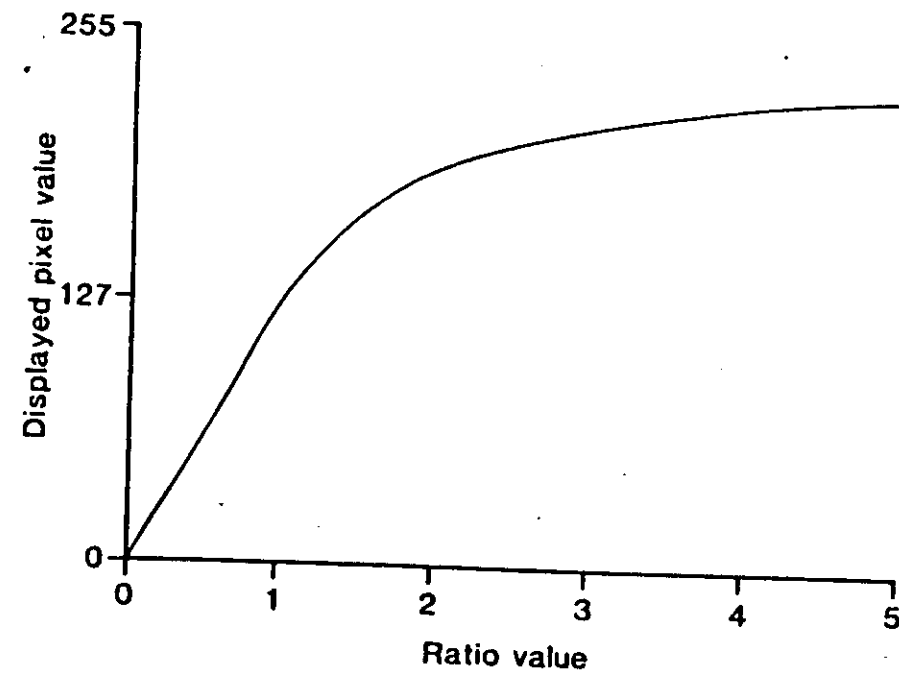
$$R(x,y) > 1.$$

Simple ratio



Normalized ratio





NORMALIZED DIFFERENCE VEGETATION INDEX

$$NDVI = \frac{MSS7 - MSS5}{MSS7 + MSS5}$$

$$NDVI = \frac{AVHRR2 - AVHRR1}{AVHRR2 + AVHRR1}$$

