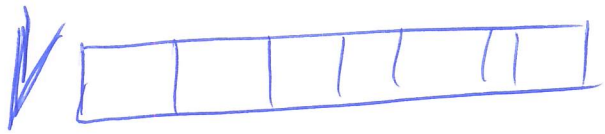
$S = \{ c_0, c_1, \ldots, c_N \}$

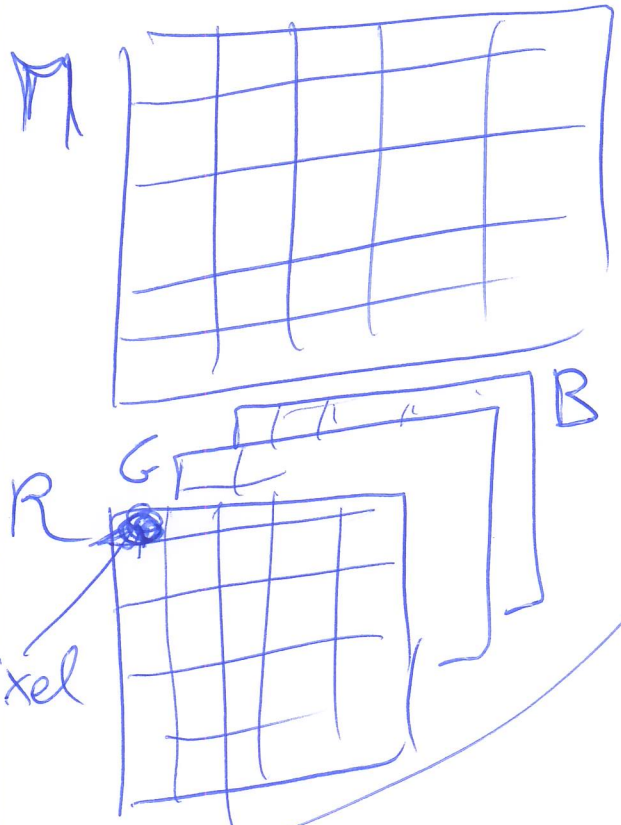


1

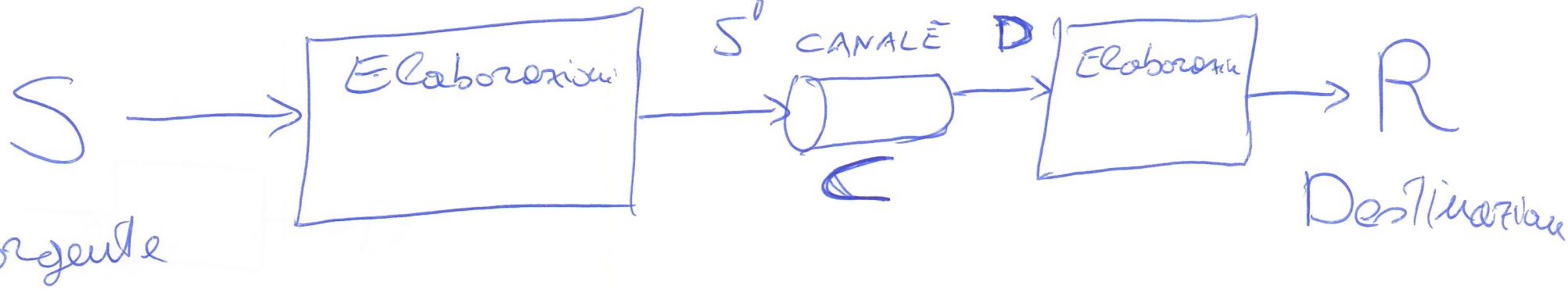
$c \rightarrow$ n bit

8 bit ← int, uint

16 bit ← float



Segnale RAW



$S \simeq R$?

→ Metriche oggettive → MAE, PSNR

$$MAE = \frac{1}{N}\sum_{i=1}^{N} |s_i - r_i| \quad ; \quad MSE = \frac{1}{N}\sum_{i=1}^{N} (s_i - r_i)^2$$

MEAN ABSOLUTE ERROR

Se $MAE = 0 \Rightarrow$ LOSSLESS

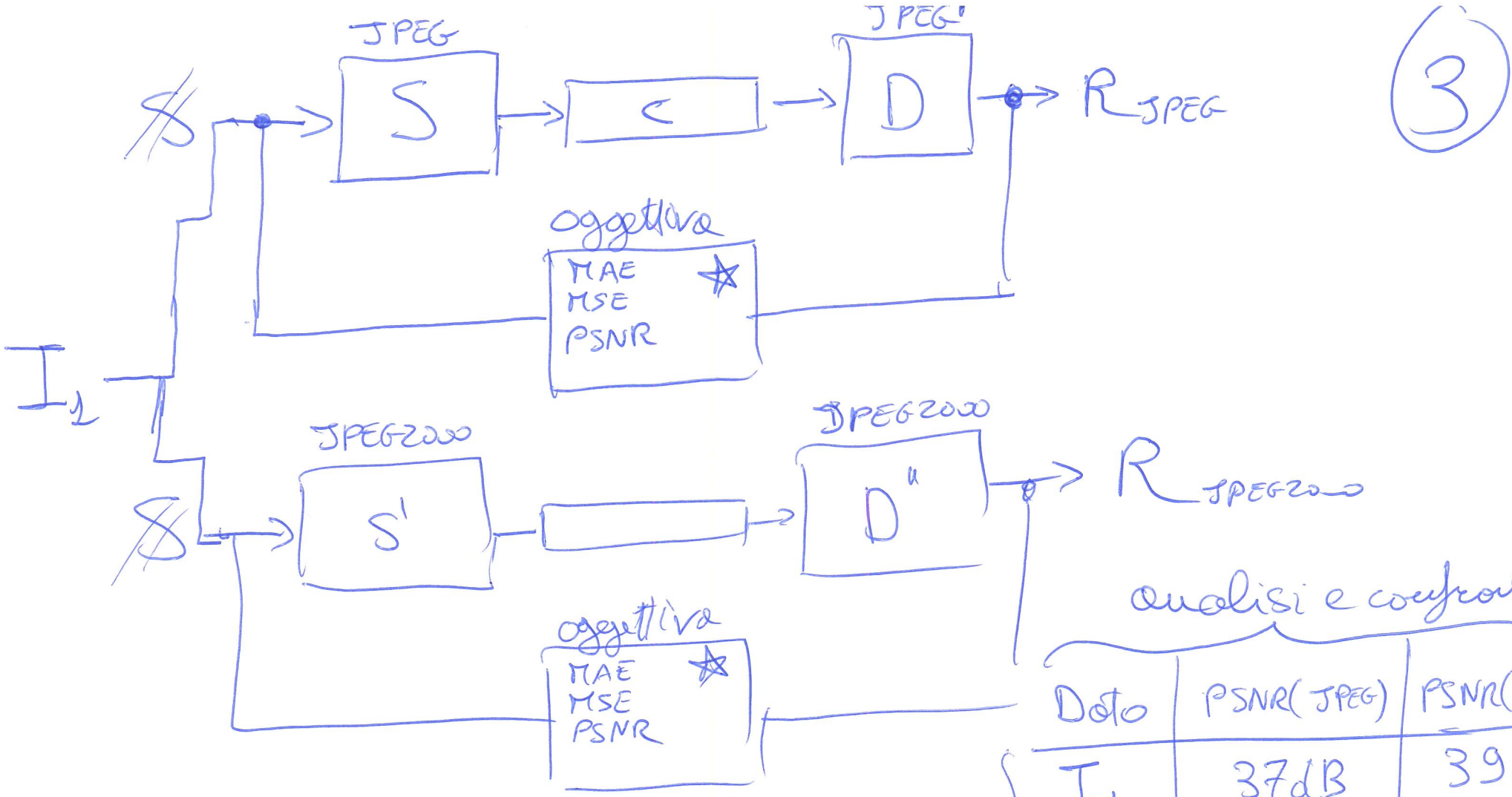
Se $MAE > 0 \Rightarrow$ LOSSY

PEAK SIGNAL TO NOISE RATIO

$$SNR_{dB} = \left(\frac{S}{N}\right)_{dB} \Rightarrow PSNR = 10\log_{10} \frac{\frac{1}{N}\sum_{i=1}^{N} (max)^2}{\frac{1}{N}\sum_{i=1}^{N} (s_i - r_i)^2} = 10\log_{10} \frac{\frac{1}{N}\sum_{i=1}^{N} (2^b - 1)^2}{MSE}$$

$PSNR(S, R) = 17\,dB$ esempio

$PSNR(S', R') = 45\,dB$ esempio



3

analisi e confronto

Dato	PSNR(JPEG)	PSNR(JPEG2000)
I_1	37dB	39dB
I_2	42dB	44dB
⋮		
I_{150}	37dB	36dB

$PSNR(S, R) = 58\,dB$ (altissimo)

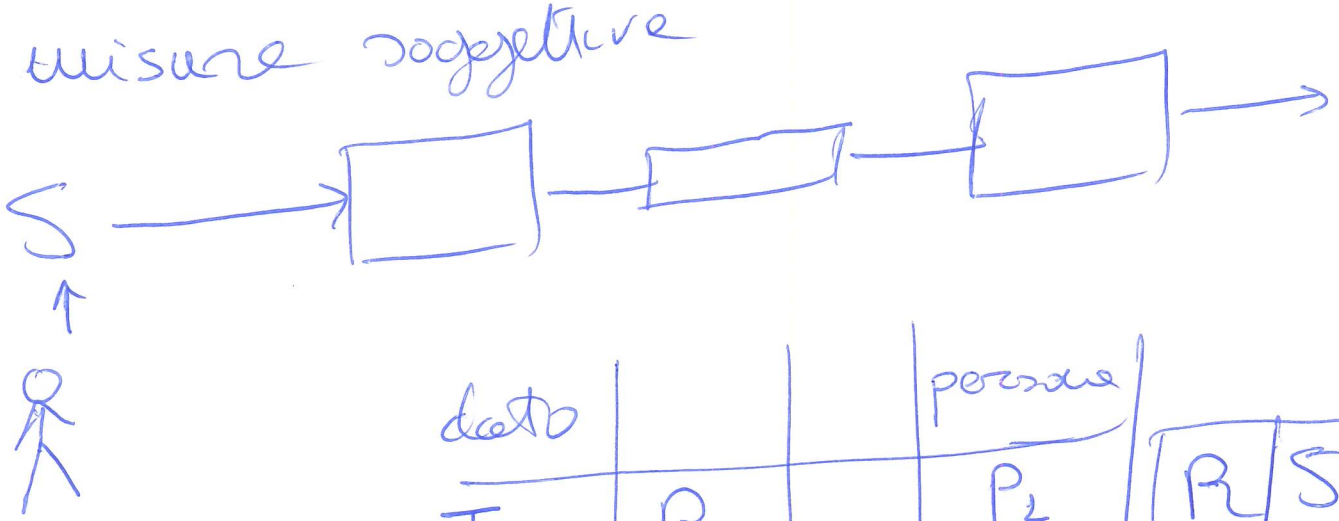
R → (immagine)

scala da 1 (pessima) - 5 (ottima)

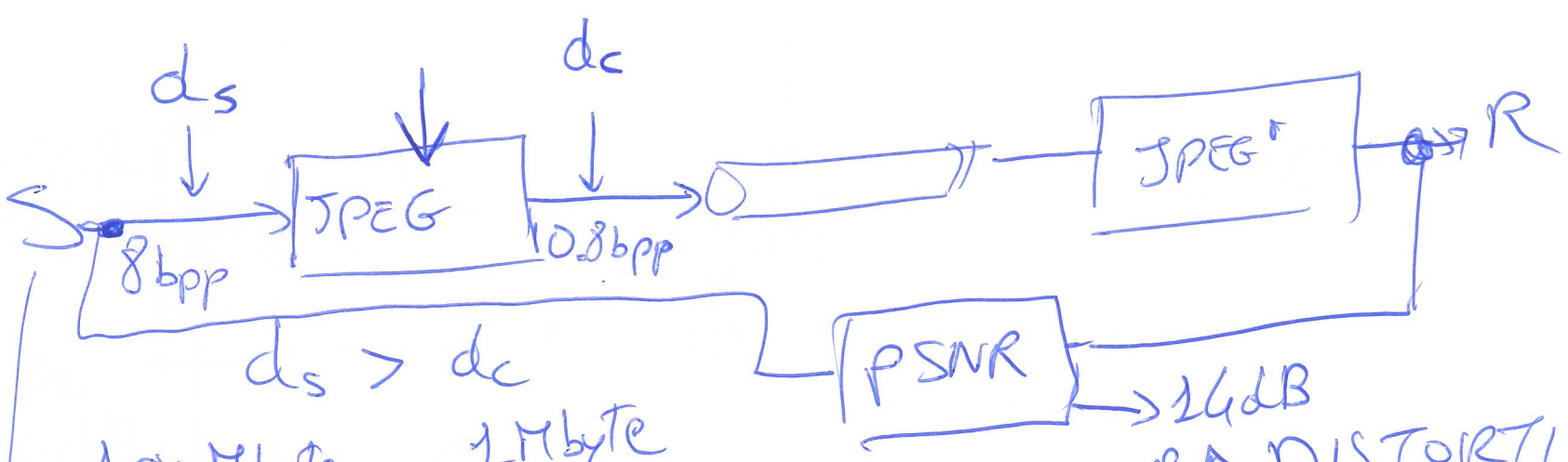
MEAN OPINION SCORE

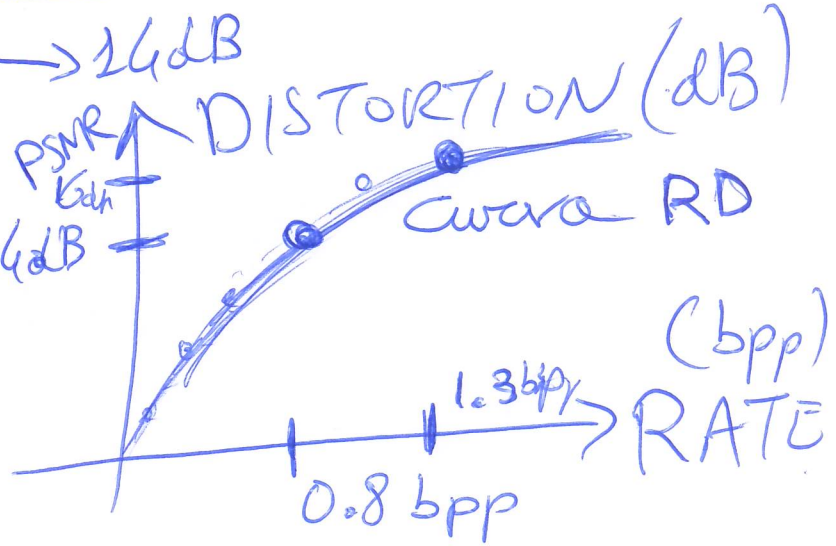
$MOS = \frac{5+3+4+1}{4}$

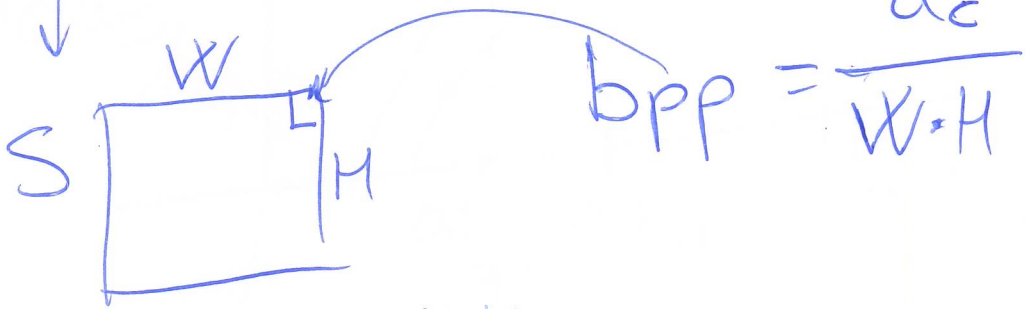
misure soggettive



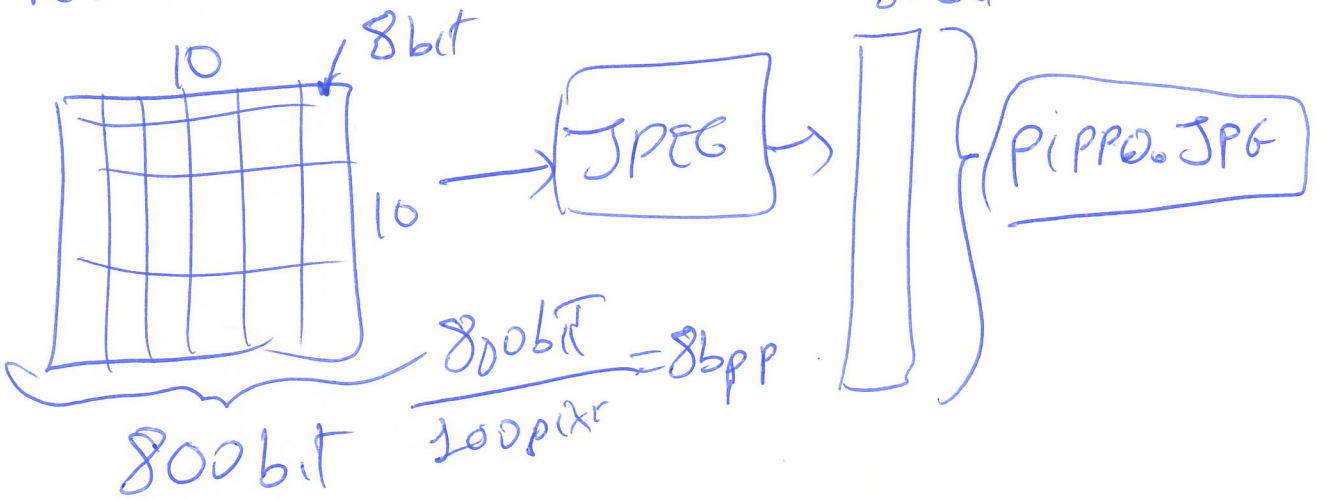
dato		persone	R	S
I_1	R	P_2		
		P_2		
		P_3		
		P_4		
		⋮		







Risoluzione = $W \cdot H$



$\frac{80bit}{100 \text{ pixel}} = 0.8 bpp$