Definition:

$$\text{Embedding Efficiency} = \frac{(\#\text{bits embedded in cover image})}{(\text{distortion between cover \& stego})}$$

Calculating Numerator:

$l = \begin{pmatrix} \text{length of message to} \\ \text{be embedded} \end{pmatrix}$

$\begin{pmatrix} \max \# \text{ of} \\ \text{bits/pixel} \end{pmatrix} = 1 = \chi$

$n = (\#\text{ rows in cover image})$

$m = (\#\text{ cols in cover image})$

$= (\chi \cdot n \cdot m)$

b/c we are using full capacity of image

$\begin{pmatrix} \#\text{bits embedded in} \\ \text{cover image} \end{pmatrix} = \chi \cdot \min(l, (n \cdot m))$

Calculating Denominator

$n = (\#\text{ rows in cover img})$

$m = (\#\text{ cols in cover img})$

$\delta = $ kronecker delta fx

Definition given in class:

$$\sum_{i=1}^{m} \sum_{j=1}^{N} (1 \cdot \delta(a_{ij} - b_{ij}))$$

↳ Summation of differences for each pixel in cover/stego

for all n:
    for all m:
        total diff += $(1 - \delta(\text{cover}_{nm} - \text{stego}_{nm}))$

N = rows in img.

M = cols in img.

a = cover image

b = stego image

$$\delta(x) = \begin{cases} 1 & x = 0 \\ 0 & x \neq 0 \end{cases}$$

Embedding Efficiency $= \dfrac{(N \cdot M)}{\left(\sum_{i=1}^{m} \left(\sum_{j=1}^{N} \left(1 - \delta\left(a_{ij} - b_{ij} \right) \right) \right) \right)}$