2.

A $X_1 + X_2 = X_3 \Rightarrow X_3 = \frac{I_{..}}{I_{..}}$

$$X_3 = \frac{I_{11}}{I_{21}} + \frac{I_{12}}{I_{22}}$$

$$= I_{22} * I_{11} / I_{21} / I_{22} + I_{12} * I_{21} / I_{22} / I_{21}$$

$$= (I_{22} * I_{11} + I_{12} * I_{21}) / I_{21} / I_{22}$$

$$= (\underbrace{I_{22} * I_{11} + I_{12} * I_{21}}_{I}) / (\underbrace{I_{21} * I_{22}}_{I})$$

$$= \frac{I_{..}}{I_{..}}$$

B $I_{max} = 2^0 + 2^1 + \cdots + 2^{15} = \sum_{n=0}^{15} 2^n = 65535$

C. $\frac{1}{65535}$

D. 65535

E. $\frac{1}{65534 * 65535} = \frac{1}{4294770690} = 2.328413 \times 10^{-9}$

F. $X_1 = \frac{I_1}{I_2}$ $X_2 = \frac{I_3}{I_4}$

Assume $X_1 > X_2 \Rightarrow \frac{X_1 - X_2}{\text{[illegible]}}$ want $1 - \frac{X_2}{\text{[illegible]}}$ minimum [illegible] X_1 want [illegible] X_1 minimum

want $\frac{X_2}{X_1}$ maximum $\left(\frac{X_2}{X_1} < 1\right)$ $\because X_1 > X_2$

$$\frac{X_2}{X_1} = \frac{\frac{65533}{65534}}{\frac{65534}{65535}} \qquad 1 - \frac{65533 \times 65534}{65534^2}$$

G. The advantage is that this method is more accurate than the real number expressed by floating numbers. However. The range of real number obtained by this way is too small.

This is not a good way to represent real numbers on computer. Like $\frac{1}{2}, \frac{2}{4}, \frac{4}{8}$ ...

all of these are 0.5 (It seem like to waste the store)

range is much smaller than float