

Comparing Floats

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$$\sqrt{(x \cdot x \cdot x)} \neq \sqrt{x} \cdot \sqrt{x} \cdot \sqrt{x}$$

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$$\sqrt{(x \cdot x \cdot x)} \neq \sqrt{x} \cdot \sqrt{x} \cdot \sqrt{x}$$

$$x = y$$

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$$\sqrt{(x \cdot x \cdot x)} \neq \sqrt{x} \cdot \sqrt{x} \cdot \sqrt{x}$$

$$x = y \quad x$$

Comparing Floats

$$\sqrt{(x \cdot x \cdot x)} \neq \sqrt{x} \cdot \sqrt{x} \cdot \sqrt{x}$$

$$x = y \quad x$$

$$x \approx y$$

Comparing Floats

$$\sqrt{(x \cdot x \cdot x)} \neq \sqrt{x} \cdot \sqrt{x} \cdot \sqrt{x}$$

$$x = y \quad \times$$

$$x \approx y \quad \checkmark$$

Comparing Floats

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$$|x - y| < e ?$$

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$$|x - y| < e ?$$

$$x = 1,000,000.01$$

$$y = 1,000,000$$

Comparing Floats

$$|x - y| < e ?$$

$$x = 1,000,000.01$$

$$y = 1,000,000$$

$$x = 1.01$$

$$y = 1$$

Comparing Floats

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$$|x - y| / \max(|x|, |y|) < \epsilon ?$$

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$$|x - y| / \max(|x|, |y|) < \epsilon ?$$

$$z_i \sim N(\mu, \sigma)$$

$$x = \sum z_i / n$$

$$y = \mu$$

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$$|x - y| / (c + \max(|x|, |y|)) < e ?$$

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$$|x - y| / (c + \max(|x|, |y|)) < \epsilon ?$$

$$\max(|x|, |y|) \ll c \quad |x - y| / c$$

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$$|x - y| / (c + \max(|x|, |y|)) < e ?$$

$$\max(|x|, |y|) \ll c \quad |x - y| / c$$

$$\max(|x|, |y|) \gg c \quad |x - y| / \max(|x|, |y|)$$

Comparing Floats

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Not transitive!

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Not transitive!

$$x \approx y$$

$$y \approx z$$

$$x \not\approx z$$

Comparing Floats

Not transitive!

$$x \approx y$$

$$y \approx z$$

$$x \not\approx z$$

I DON'T CARE!