

Please write an outline of the main contents of the lecture.

Problem

- Denoting the area under curve on some continuous function x .

- Use Riemann interval

$$F(x) = \int_a^x f(t) dt \quad x \text{ in } [a, b]$$

Fundamental theorem of calculus

$$\frac{dF}{dx} = \frac{d}{dx} \int_a^x f(t) dt = f(x)$$

Allows us to solve the Riemann integral using derivative

Example

$$\frac{d}{dx} \int_{\pi}^x \frac{\cos^2 t}{\ln(t - \sqrt{t})} dt = \frac{\cos^2 x}{\ln(x - \sqrt{x})}$$

5/19/2015
12 PM

Roz

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Group 2
(C A B)
K 5 1

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Actuarial Path
random variable X
with lower / upper limits a, b

Since X has a uniform distribution, equally
likely all values between a and b

~~Height~~
Each value from a to b has prob. $\frac{1}{b-a}$
(Area of rectangle)

COF is $\frac{x-a}{b-a}$ for $(a, b]$

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Proving formulae with Eulers

$$\text{Eulers: } e^{ix} = \cos x + i \sin x$$

$$\sin^2 x + \cos^2 x = 1$$

$$e^{ix} = \cos x + i \sin x$$

$$e^{-ix} = e^{i(-x)} = \cos(-x) + i \sin(-x) = \cos x - i \sin x$$

$$e^{ix} \cdot e^{-ix} = (\cos x + i \sin x)(\cos x - i \sin x)$$

$$1 = \cos^2 x - i \cos x \sin x + i \sin x \cos x + \sin^2 x$$

Angle sum formula

$$e^{ia} = \cos a + i \sin a$$

$$e^{ib} = \cos b + i \sin b$$

↓

$$e^{ia} e^{ib} = (\cos a + i \sin a) (\cos b + i \sin b)$$

$$e^{i(a+b)} = \cos(a+b) + i \sin(a+b)$$

$$e^{i(a+b)} = \cos(a+b) + i \sin(a+b) \quad (\cos a + i \sin a)(\cos b + i \sin b)$$

set a, b to x and save