Phasors

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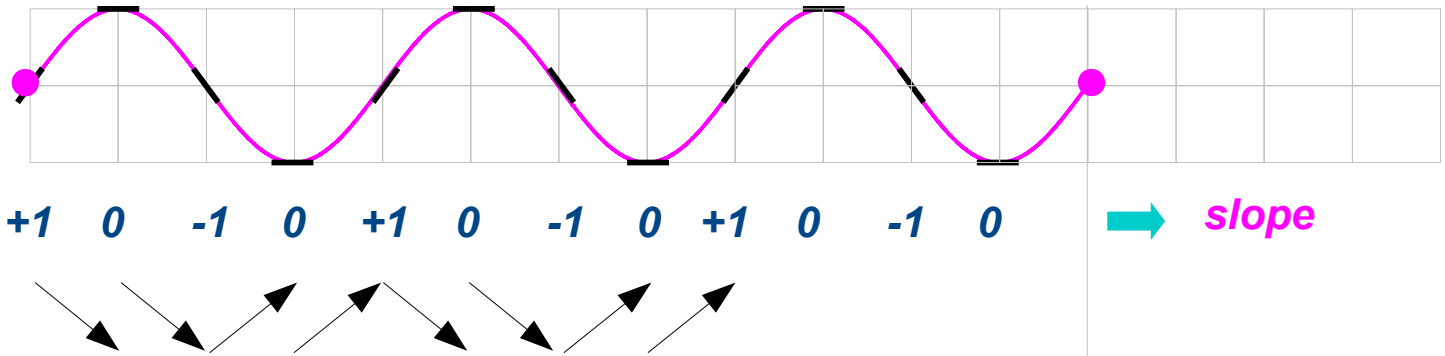
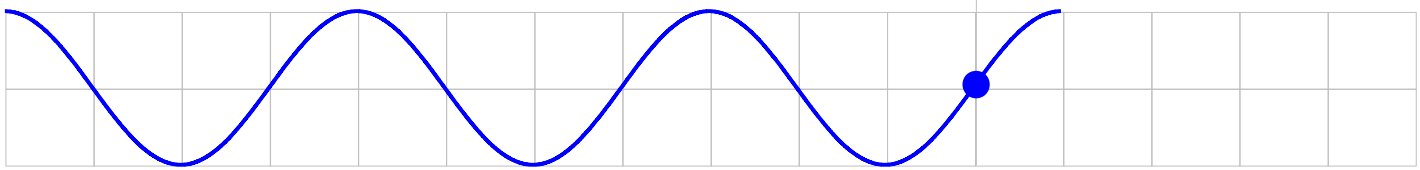
Derivative of sin(x)

$$f(x) = \sin(x)$$

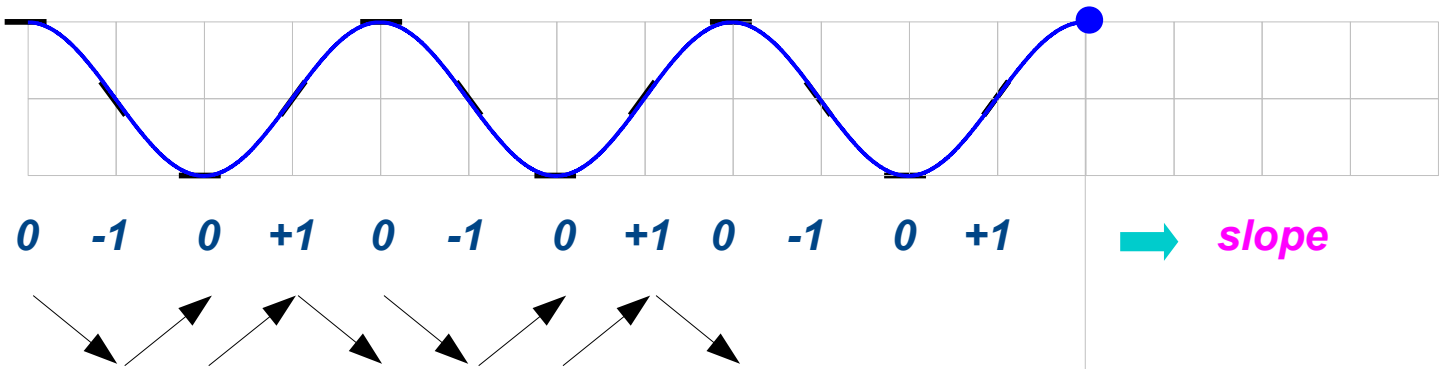


$$f'(x) = \cos(x)$$

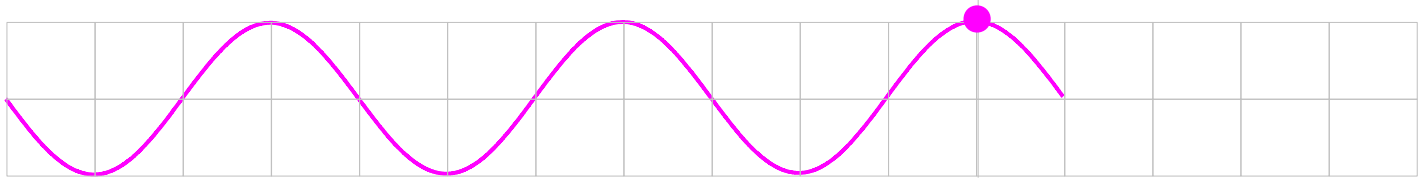


Derivative of cos(x)

$$f(x) = \cos(x)$$



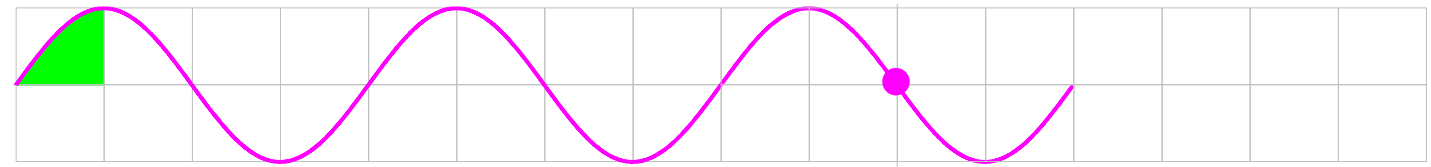
$$f'(x) = -\sin(x)$$



Integral of sin(x)

$$f(x) = \sin(x)$$

$$\int_0^{\pi/2} \sin(x)\, dx = 1$$



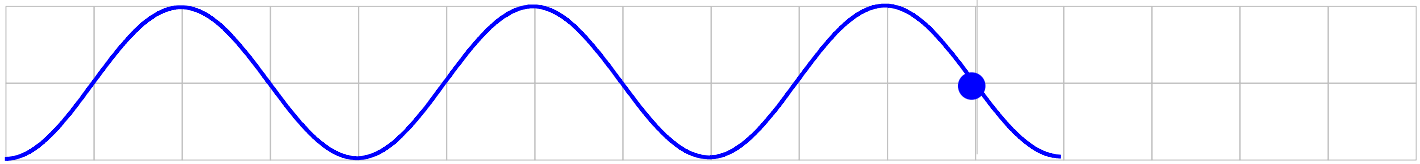
0 1 2 1 0 1 2 1 0 1 2 1 ➡ area $C = 1$

-1 0 +1 0 -1 0 +1 0 -1 0 +1 0 ➡ area - 1 $C = 0$

➡ lags

$$\int f(x)\, dx = -\cos(x) + C$$

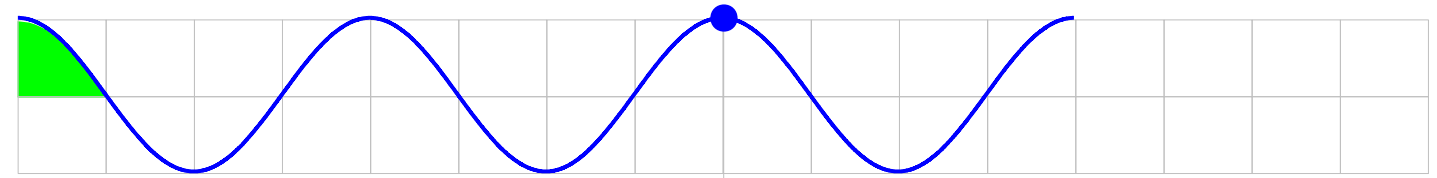
$C = 0$



Integral of cos(x)

$$f(x) = \cos(x)$$

$$\int_0^{\pi/2} \cos(x)\, dx = 1$$

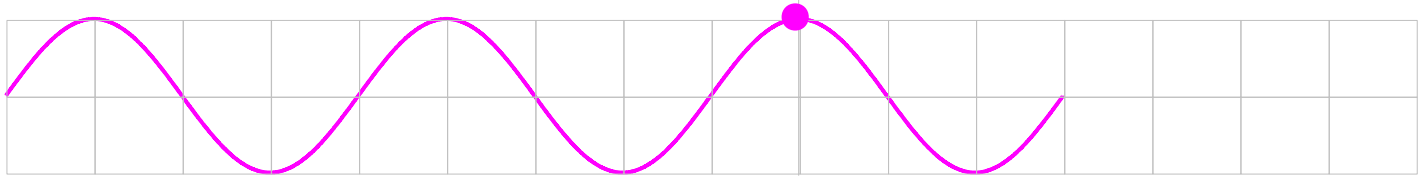


0 1 0 -1 0 1 0 -1 0 1 0 -1 ➡ area $C = 1$

➡ lags

$$\int f(x)\, dx = \sin(x) + C$$

$C = 0$



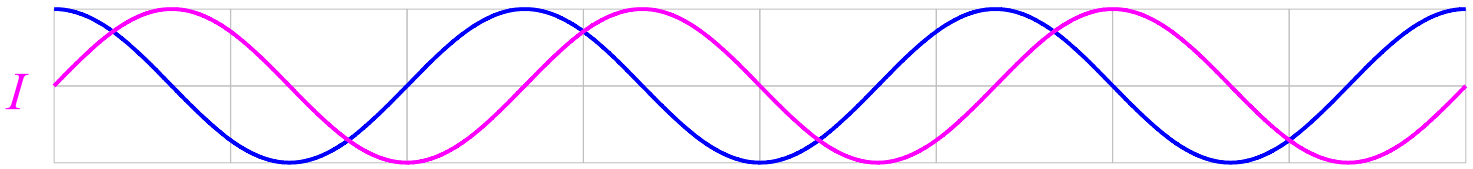
Phasor

$$A\cos(\omega t + \theta)$$

$$A\cos(\omega t + \theta) = \Re\{A e^{i(\omega t + \theta)}\}$$

$$= \Re\{e^{i\omega t} \cdot A e^{i\theta}\}$$

$$A e^{i\theta} \qquad A \measuredangle \theta$$



3 cycles

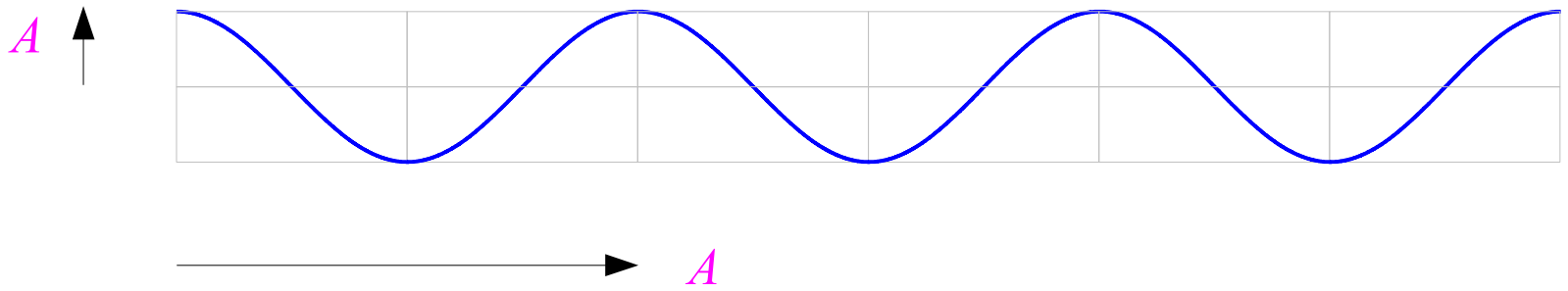
Phasor

$$A\cos(\omega t + \theta)$$

$$A\cos(\omega t + \theta) = \Re\{A e^{i(\omega t + \theta)}\}$$

$$= \Re\{e^{i\omega t} \cdot A e^{i\theta}\}$$

$$A e^{i\theta} \qquad\qquad A \measuredangle \theta$$



References

[1] http://en.wikipedia.org/
[2] J.H. McClellan, et al., Signal Processing First, Pearson Prentice Hall, 2003