

Phasor Notation

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- phasor: $\underline{a} = |\underline{a}| e^{j \arg(\underline{a})}$

\Rightarrow complex number representing amplitude and phase

- time domain signal:

$$s(t) = \sqrt{2} \operatorname{Re}(\underline{a} e^{j\omega t})$$

$$= \sqrt{2} \operatorname{Re}(\underline{a}) \cos(\omega t) - \sqrt{2} \operatorname{Im}(\underline{a}) \sin(\omega t)$$

$$= \sqrt{2} |\underline{a}| \cos(\omega t + \arg(\underline{a}))$$

- narrowband signals

- complex amplitude is changing slowly over time

- phasor \underline{a} may be considered to be one sample of the complex amplitude

Power

(average) power :

$$P = \lim_{T \rightarrow \infty} \frac{1}{T} \int_{-T/2}^{+T/2} \sigma^2(t) dt = |\underline{\sigma}|^2$$

(that's why we introduced
the " σ ")