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let $x(t)$ be the signal

$$x(t) = [10 + 5.\cos(2000\pi t + \pi/5)].\cos(10000\pi t)$$

a-) Use the euler's relation to expand $x(t)$ as a sum of complex exponential signals and show that it can be expressed in the fourier series form

$$x(t) = \sum_{k=-\infty}^{\infty} a_k e^{jk\omega_0 t}$$

My signal is → $x(t) = [10 + 5.\cos(2000\pi t + \pi/5].\cos(1000\pi t)$

euler formula → $\cos(\theta) = 1/2 (e^{j\theta} + e^{-j\theta})$ şeklinde ifade edilir

first step:

$\cos(2000\pi t + \pi/5) \rightarrow \cos(2000\pi t + \pi/5) = 1/2 (e^{j2000\pi t + \pi/5} + e^{-j(2000\pi t + \pi/5)})$

second step:

$\cos(1000\pi t) \rightarrow \cos \frac{1}{2} (e^{j1000\pi t} + e^{-j1000\pi t})$

result

$$x(t) = [10 + \frac{5}{2} (e^{j(2000\pi t + \pi/5)} + e^{-j(2000\pi t + \pi/5)})] . \frac{1}{2} (e^{j1000\pi t} + e^{-j1000\pi t})$$