

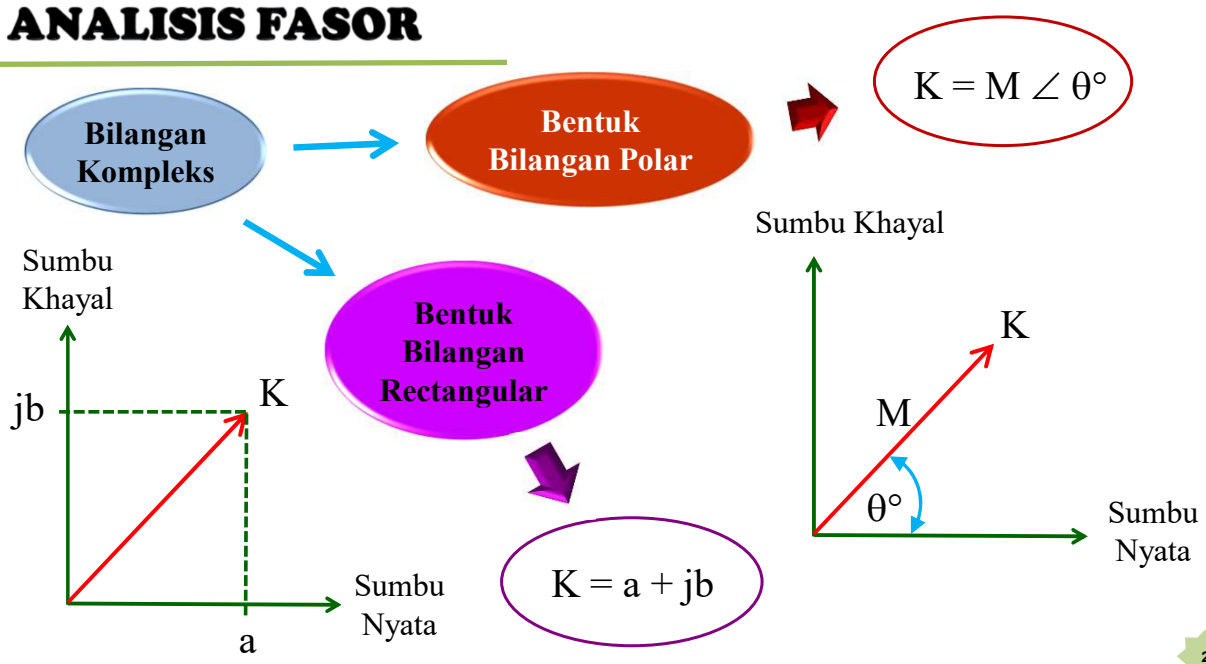


# DASAR TEKNIK TENAGA LISTRIK

## Analisis Fazor

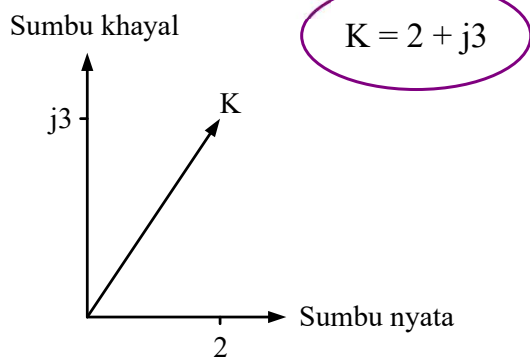
Wike Handini

### ANALISIS FASOR



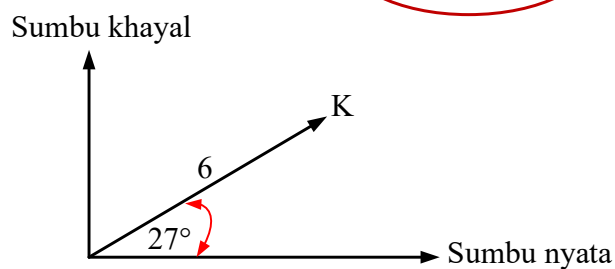
## CONTOH 1

Bentuk Bilangan Rectangular



Bentuk Bilangan Polar

$$K = 6 \angle 27^\circ$$



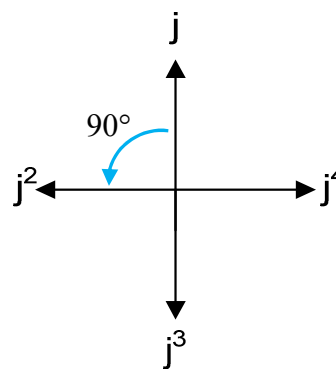
3

## ANALISIS FASOR

Perlu diperhatikan bahwa  $j$  adalah operator khayal yang bekerja dengan memutar suatu bilangan atau harga tertentu sebesar  $\frac{\pi}{2}$  derajat atau  $90^\circ$  berlawanan arah jarum jam.

$$j^2 = -1, j^3 = -j \text{ dan } j^4 = 1$$

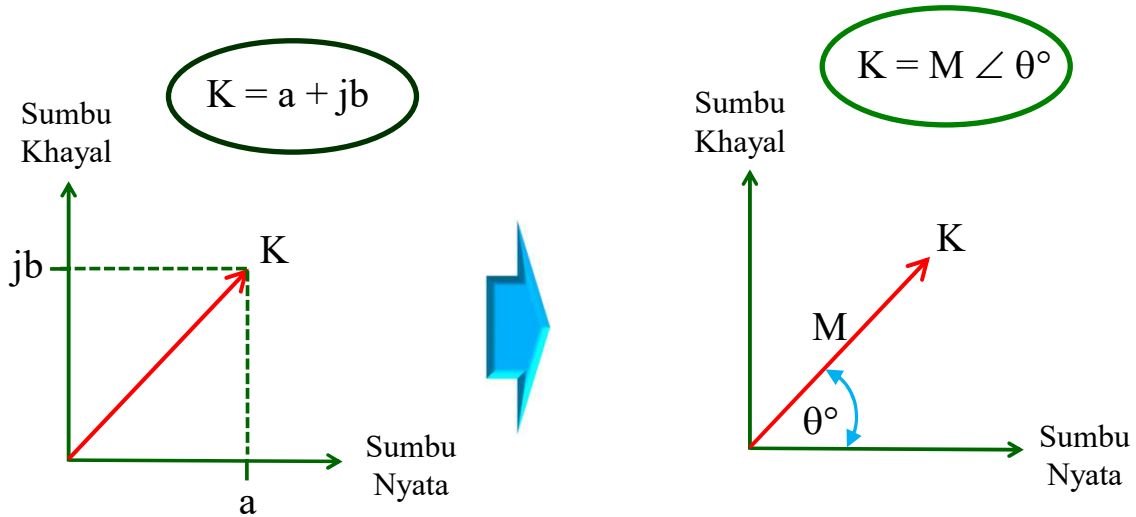
$$j = \sqrt{-1}$$



Operator  $j$

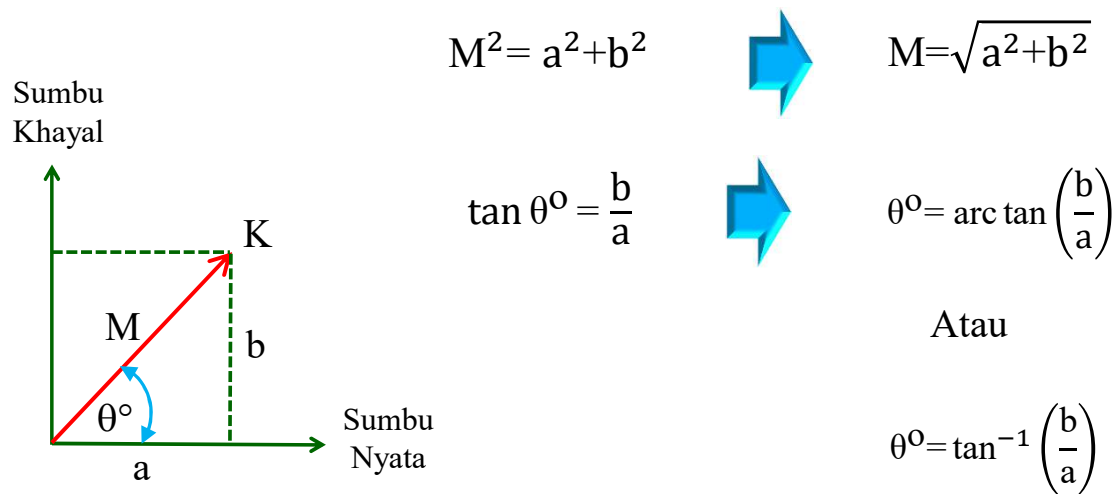
4

## TRANSFORMASI RECTANGULAR → POLAR



5

## TRANSFORMASI RECTANGULAR → POLAR



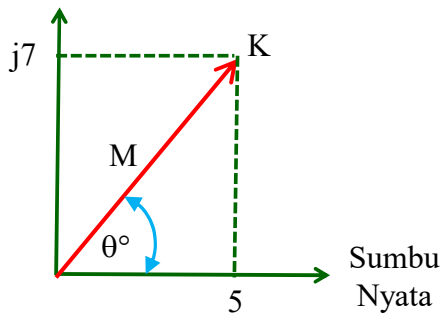
6

## CONTOH 2

Hitunglah bentuk polar dari bilangan kompleks

$$K = 5 + j7$$

Sumbu Khayal



SOLUSI

Bentuk polar  $\rightarrow K = M \angle \theta^\circ$

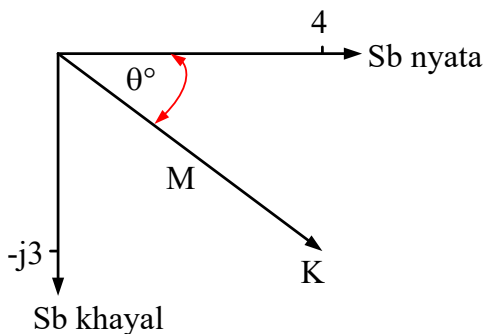
$$\begin{aligned} M &= \sqrt{a^2 + b^2} & \theta^\circ &= \tan^{-1} \frac{b}{a} \\ M &= \sqrt{5^2 + (7)^2} & \theta^\circ &= \tan^{-1} \frac{7}{5} \\ M &= \sqrt{25 + 49} & \theta^\circ &= \tan^{-1}(1,4) \\ M &= \sqrt{74} & \theta^\circ &= 54,46^\circ \\ M &= 8,6 \end{aligned}$$

$$K = 5 + j7 = 8,6 \angle 54,46^\circ$$

7

## CONTOH 3

Hitunglah bentuk polar dari bilangan kompleks  $K = 4 - j3$



SOLUSI

Bentuk polar  $\rightarrow K = M \angle \theta^\circ$

$$\begin{aligned} M &= \sqrt{a^2 + b^2} & \theta^\circ &= \tan^{-1} \frac{b}{a} \\ M &= \sqrt{4^2 + (-3)^2} & \theta^\circ &= \tan^{-1} \frac{-3}{4} \\ M &= \sqrt{16 + 9} & \theta^\circ &= \tan^{-1}(-0,75) \\ M &= \sqrt{25} & \theta^\circ &= -36,87^\circ \\ M &= 5 \end{aligned}$$

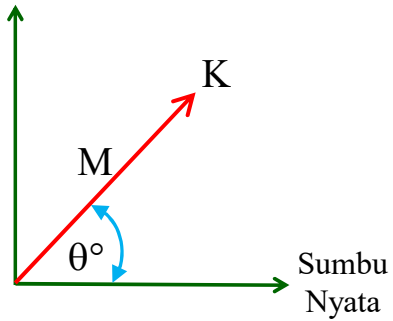
$$K = 4 - j3 = 5 \angle -36,87^\circ$$

8

## TRANSFORMASI POLAR → RECTANGULAR

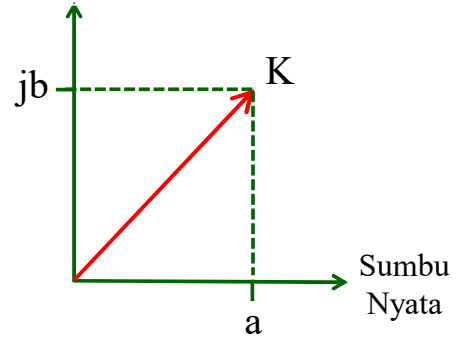
$$K = M \angle \theta^\circ$$

Sumbu Khayal



$$K = a + jb$$

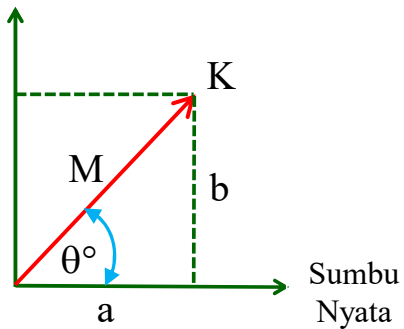
Sumbu Khayal



9

## TRANSFORMASI POLAR → RECTANGULAR

Sumbu Khayal



$$\cos \theta^\circ = \frac{a}{M}$$



$$a = M \cos \theta^\circ$$

$$\sin \theta^\circ = \frac{b}{M}$$



$$b = M \sin \theta^\circ$$

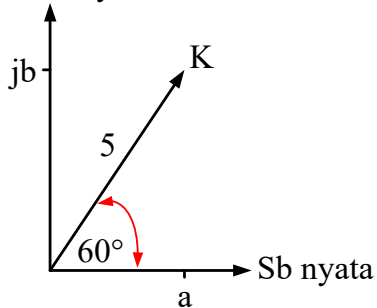
10

## CONTOH 4

Hitunglah bentuk rectangular dari bilangan kompleks

$$K = 5 \angle 60^\circ$$

Sb khayal



SOLUSI

Bentuk rectangular  $\rightarrow K = a + jb$

$$a = M \cos \theta^\circ \quad b = M \sin \theta^\circ$$

$$a = 5 \cos 60^\circ \quad b = 5 \sin 60^\circ$$

$$a = 5 \times 0,5 \quad b = 5 \times 0,87$$

$$a = 2,5 \quad b = 4,33$$

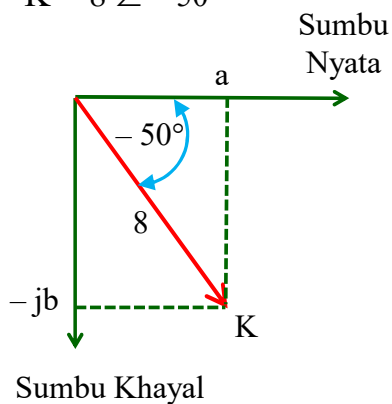
$$K = 5 \angle 60^\circ = 2,5 + j4,33$$

11

## CONTOH 5

Hitunglah bentuk rectangular dari bilangan kompleks

$$K = 8 \angle -50^\circ$$



SOLUSI

Bentuk rectangular  $\rightarrow K = a + jb$

$$a = M \cos \theta^\circ \quad b = M \sin \theta^\circ$$

$$a = 8 \cos (-50^\circ) \quad b = 8 \sin (-50^\circ)$$

$$a = 8 \times 0,64 \quad b = 8 \times -0,766$$

$$a = 5,14 \quad b = -6,13$$

$$K = 8 \angle -50^\circ = 5,14 - j6,13$$

12