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Eletricidade CA - Tarefa 2

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1º) Resolva c/ números complexos, na forma retangular:

a) $(2 + j3) + (5 - j2) = 7 + j$

b) $(10 - j5) + (7 + j2) = 17 - j3$

c) $(5 + j5) - (2 + j3) = 3 + j2$

d) $(20 + j5) - (12 - j2) = 8 + j3$

2º) Resolva c/ números complexos, na forma polar:

a) $20 < 30° + 20 < 45° =$

$X1 = 20 \cos(30) = 17,32$ } $= 17,32 + j10$

$Y1 = 20 \text{ sen } (30) = 10$ }

$X2 = 20 \cos(45) = 14,14$ } $= 14,14 + j14,14$

$Y2 = 20 \text{ sen}(45) = 14,14$ }

Somando: $31,46 + j24,14$

$Z = \sqrt{(31,46^2 + 24,14^2)} \rightarrow Z = 39,65$

$\emptyset = \text{arc tang}\left(\frac{24,14}{31,45}\right) \rightarrow \emptyset = 37,40°$

b) $15 < 20° + 10 < 45° =$

$X1 = 15 \cos(20) = 14,09$ } $= 14,09 + j5,13$

$Y1 = 15 \text{ sen } (20) = 5,13$ }

$X2 = 10 \cos(45) = 7,07$ } $= 7,07 + j7,07$

$Y2 = 10 \text{ sen } (45) = 7,07$ }

Somando: $21,16 + j12,2$

$Z = \sqrt{(21,16^2 + 12,2^2)} \rightarrow Z = 24,42$

$\emptyset = \text{arc tang}\left(\frac{12,2}{21,16}\right) \rightarrow \emptyset = 29,96°$

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c) $30 < 40° - 20 < 45° =$

$X1 = 30 \cos(40) = 22,98$
$Y1 = 30 \operatorname{sen}(40) = 19,28$ $\} = 22,98 + j\,19,28$

$X2 = 20 \cos(45) = 14,14$
$Y2 = 20 \operatorname{sen}(45) = 14,14$ $\} = 14,14 + j\,14,14$

Subtraindo: $8,84 + j\,5,14$

$\rightarrow Z = \sqrt{(8,84^2 + 5,14^2)} \rightarrow Z = 10,22$

$\phi = \arctan\left(\frac{5,14}{8,84}\right) \rightarrow \phi = 30,17°$

d) $35 < 30° - 20 < 15° =$

$X1 = 35 \cos(30) = 30,31$
$Y1 = 35 \operatorname{sen}(30) = 17,5$ $\} = 30,31 + j\,17,5$

$X2 = 20 \cos(15) = 19,31$
$Y2 = 20 \operatorname{sen}(15) = 5,17$ $\} = 19,31 + j\,5,17$

Subtraindo: $11 + j\,12,33$

$\rightarrow Z = \sqrt{(11^2 + 12,33^2)} \rightarrow Z = 16,52$

$\phi = \arctan\left(\frac{12,33}{11}\right) \rightarrow \phi = 48,26°$

3º) Regra:

a) $(20 < 30°) \cdot (20 < 45°) =$

$\frac{(20)\cdot(20)}{30+45} = \frac{400}{75°}$

b) $(15 < 20°) \cdot (10 < 45°) =$

$\frac{(15)\cdot(10)}{20+45} = \frac{150}{65°}$

c) $(30 < 40°) / (20 < 45°) =$

$\frac{(30)\cdot(20)}{40+45} \rightarrow \frac{600}{85°}$

d) $(35 < 30°) / (20 < 15°) =$

$\frac{(35)\cdot(20)}{30+15} = \frac{700}{45°}$

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(4) Resolva:

a) $(20 \angle 30°) \cdot (2 + j5) =$

$z = \sqrt{(2^2 + 5^2)} \Rightarrow z = 5,38$

$\phi = \text{arc tang}\left(\frac{5}{2}\right) \Rightarrow \phi = 68,19°$

$\therefore (20 / 30°) \cdot (5,38 / 68,19°)$

$\frac{(20) \cdot (5,38)}{30° + 68,19°} \Rightarrow \frac{107,6}{98,19°}$

b) $(15 \angle 20°) \cdot (10 - j2) =$

$z = \sqrt{(10^2 + (-2)^2)} \Rightarrow z = 10,19$

$\phi = \text{arc tang}\left(\frac{2}{10}\right) \Rightarrow \phi = 11,3°$

$\therefore (20 / 30°) \cdot (10,19 / 11,3°)$

$\frac{(20) \cdot (11,3)}{30° + 11,3°} \Rightarrow \frac{226}{41,3°}$

c) $(2 + j5) / (20 \angle 45°) =$

$z = \sqrt{(2^2 + 5^2)} \Rightarrow z = 5,38$

$\phi = \text{arc tang}\left(\frac{5}{2}\right) \Rightarrow \phi = 68,19°$

$\therefore$

$(5,38 / 68,19°) / (20 / 45°)$

$\frac{(20) / (5,38)}{68,19° - 45°} \Rightarrow \frac{3,71}{23,19°}$

d) $(10 - j2) / (20 \angle 15°) =$

$z = \sqrt{10^2 + (-2)^2} \Rightarrow z = 10,19$

$\phi = \text{arc tang}\left(\frac{2}{10}\right) \Rightarrow \phi = 11,3°$

$(10,19 / 11,3°) / (20 / 15°) \Rightarrow \frac{0,51}{-3,7°}$

$(10,19) / (20) / 11,3 + 15$