

1. week.

SHIP ELECTRONICS

Assoc. Prof. Muhammed Emin BAŞAK

eminbasak@gmail.com

mebasak@gildiz.edu.tr

T-404

CONTENTS

- 1- Basic Concepts, KCL, KVL, Ohm's Law
- 2- Semiconductor materials
 - Diode 
 - BJT 
 - Kondensator 
- 3- Diodes
- 4- Diode Applications
- 5- Bipolar Transistors (BJT)
- 6- Application of BJTs
- 7- MOSFETS
- 8- Application of MOSFETS
- 9- Op-Amps
- 10- Application of Op-Amps
- 11- Ship Electronics.



Geane Netz → 40 → DC

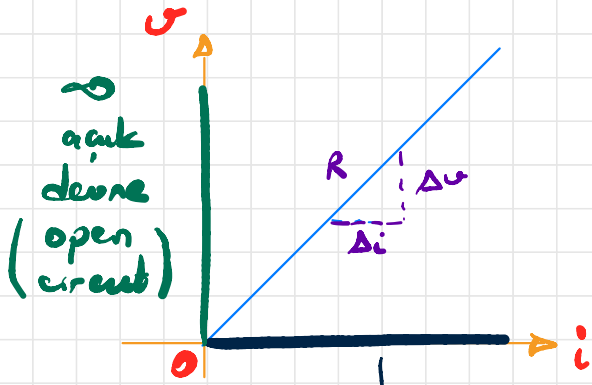
EXAM

- 1- Midterm Exam → %30
 - 2- Final Exam → %40
 - 3- Quizes
 - 1. Quiz
 - 2. Quiz + Telafer }
- %30

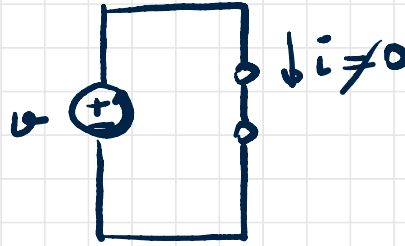
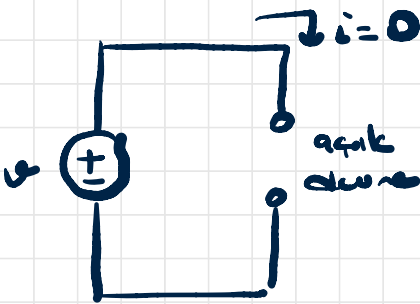
OHM KANUNU



$$U = i \cdot R$$



$R = ? 0$
kısa devre (short circuit)



$$U = i \cdot R$$

→ Ohm kanunu.

$\swarrow$ Volt (V)
 $\downarrow$ Amper (A)
 $\searrow$ (Ohm) Direnç

$$R = \frac{1}{G}$$

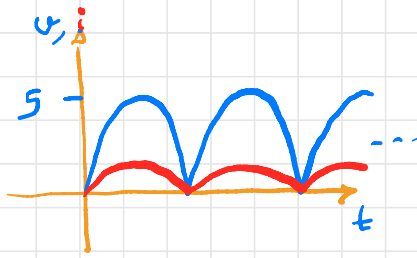
$$I = U \cdot G$$

→ OHM KANUNU

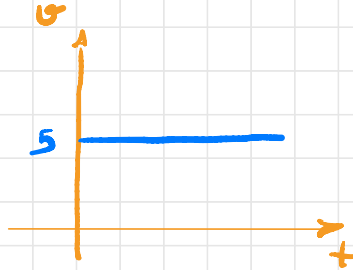
$\swarrow$ Amper
 $\downarrow$ Volt
 $\searrow$ İletkenlik (Siemens) $\text{mHO } \Omega$



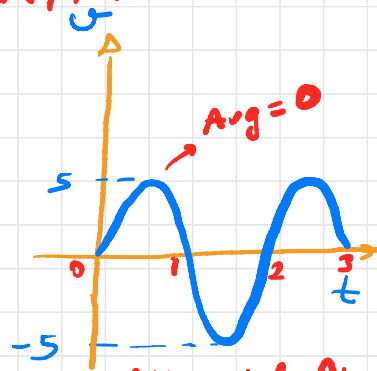
GERİLİM KAYNAĞI - AKIM KAYNAĞI



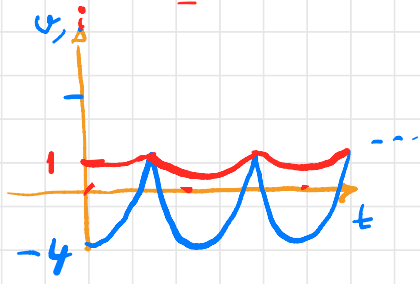
Doğru Akım



DC

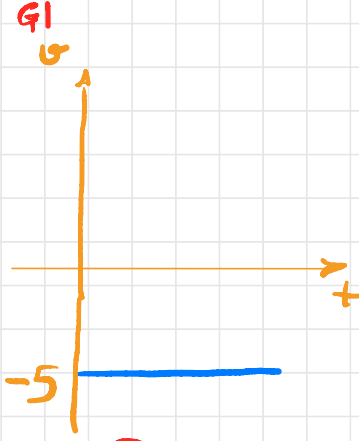


Alternatif Akı



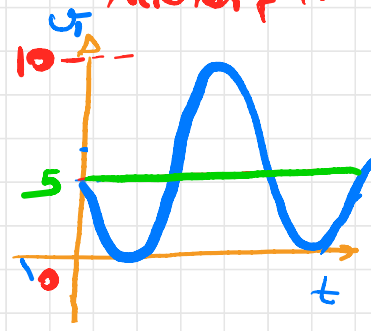
DC

Avg $\neq 0$



DC

Avg $\neq 0$

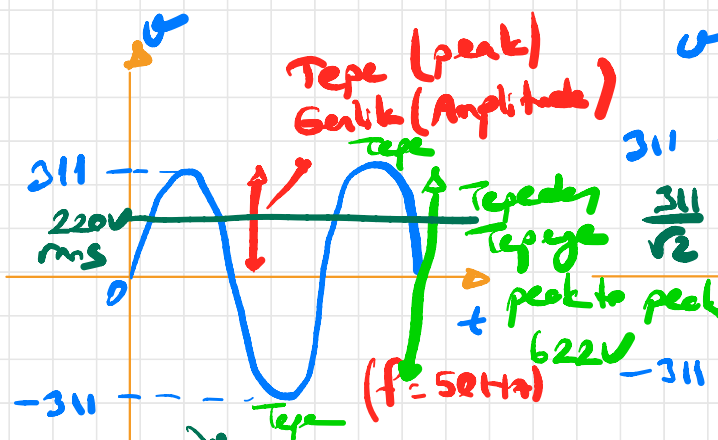


$$V_1 = 5 - 5 \sin \omega t$$

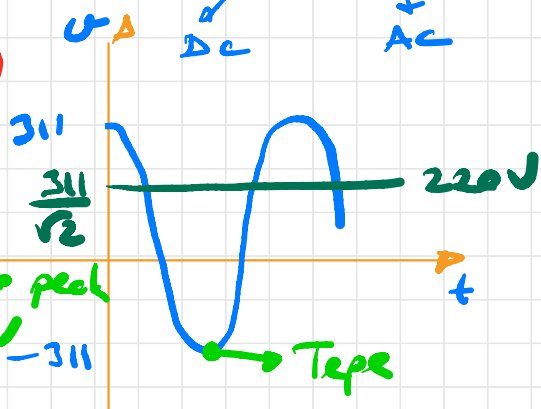
AC+DC

$$5V + 5 \cos \omega t$$

DC AC



$$V = 311 \sin(2\pi \cdot 50t)$$



$$V = 311 \sin(2\pi 50t + 90)$$

RMS Değer / Etkin Değer / Efektif Değer

$$\frac{311V}{\sqrt{2}} \approx 220V$$

RMS Değer
Etkin Değer
Efektif Değer

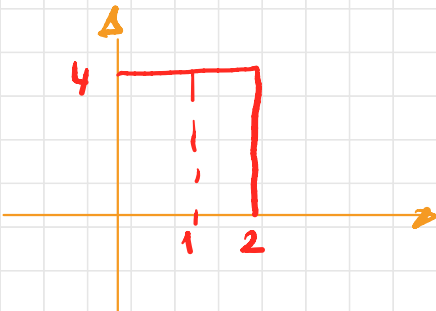
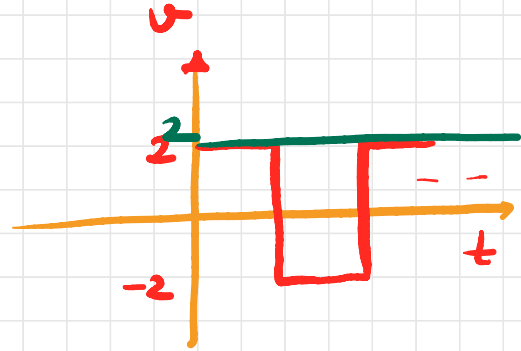
Root-Mean-Square Value

$$\sqrt{\frac{1}{T} \int_0^T v^2(t) dt} = v_{rms}$$

Sinüsoidal $\rightarrow \frac{v_{max}}{\sqrt{2}}$

Üçgen $\rightarrow \frac{v}{\sqrt{3}}$

Kare $\rightarrow \frac{1}{T} \int_0^T v dt$



2. HAFTA

2.1. HAFTA

2.1.1. HAFTA

2.1.2. HAFTA

2.1.3. HAFTA

2.1.4. HAFTA

2.1.5. HAFTA

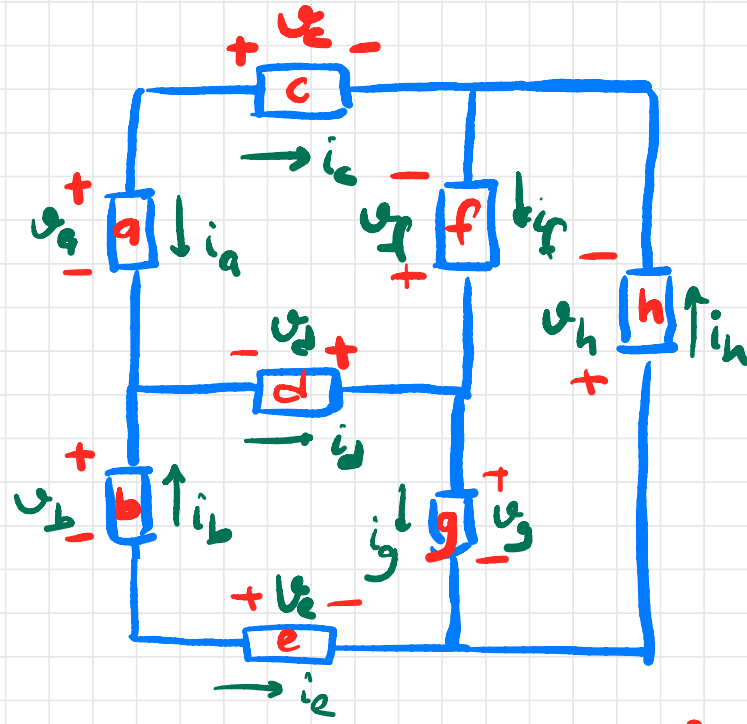
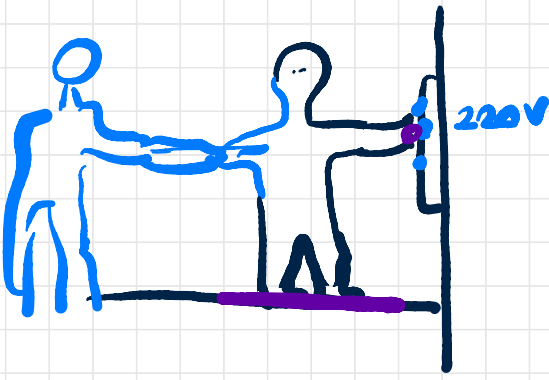
2.1.6. HAFTA

2.1.7. HAFTA

2.1.8. HAFTA

2.1.9. HAFTA

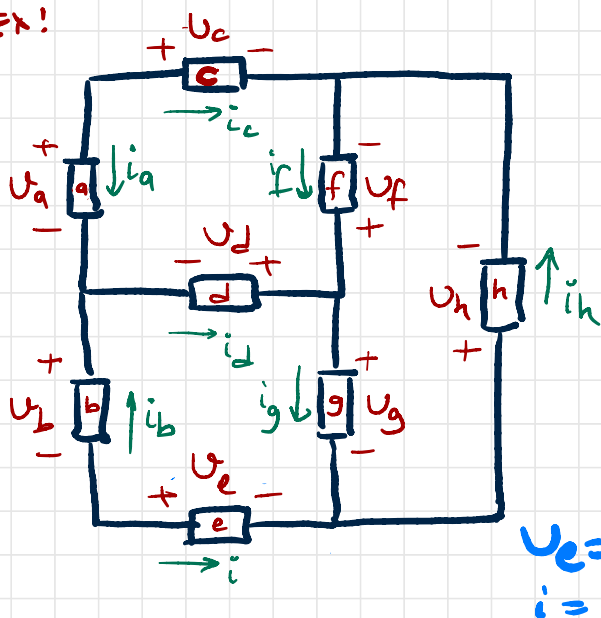
2.1.10. HAFTA



Eleman	Gerilim	Akım
a	120V	-10A
b	120V	9A
c	10V	10A
d	10V	-1A
e	-6V	-9A
f	-100V	5A
g	120V	4A
h	-220V	-5A

Soru: Üretilen güç nedir?
 Tüketilen güç nedir?
 Toplam güç nedir?

Ex!



Component	$V(V)$	$i(A)$
a	120	-10
b	120	9
c	10	10
d	10	-1
e	-10	-9
f	-100	5
g	120	4
h	-220	-5

$$V_e = 10$$

$$i = +9$$

$$\sum P = 0$$

$$P_a = +V_a \cdot i_a = 120 \cdot (-10) = -1200 \text{ W (üreteci)}$$

$$P_b = -V_b \cdot i_b = -(120) 9 = -1080 \text{ W (üreteci)}$$

$$P_c = +V_c \cdot i_c = 10 \cdot 10 = 100 \text{ W (tüketicisi)}$$

$$P_d = -V_d \cdot i_d = -(10)(-1) = 10 \text{ W (tüketicisi)}$$

$$P_e = +V_e \cdot i_e = (-10)(-9) = 90 \text{ W (tüketicisi)}$$

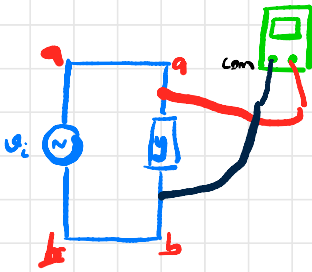
$$P_f = -V_f \cdot i_f = -(-100)(5) = 500 \text{ W (tüketicisi)}$$

$$P_g = +V_g \cdot i_g = (120)(4) = 480 \text{ W (tüketicisi)}$$

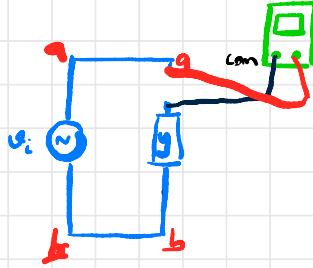
$$P_h = V_h \cdot i_h = (-220)(-5) = 1100 \text{ W (tüketicisi)}$$

$$P_{\text{supplied}} + P_{\text{consumed}} = 0$$

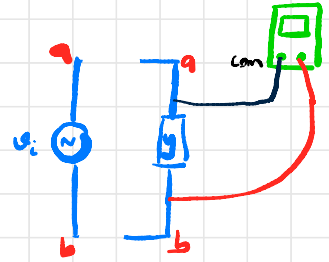
Gerilim Ölçümü



Akım Ölçümü

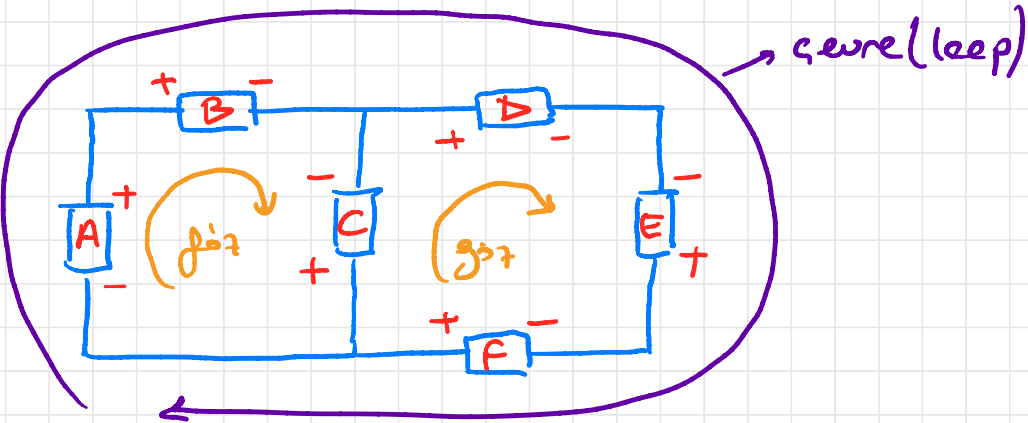


Direnç Ölçümü



Kayıp olan nedir
ayrılır.

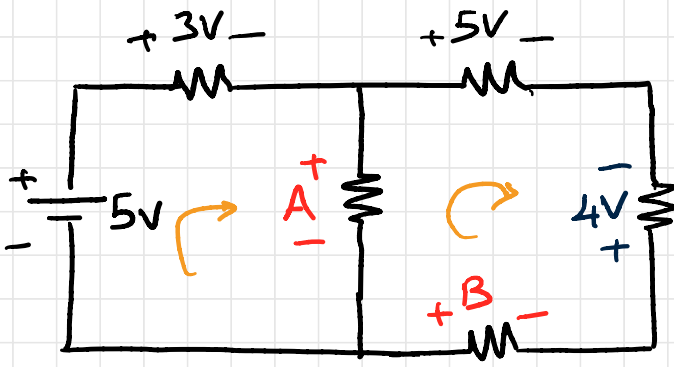
KIRCHOFF'UN GERİLİM YASASI



$$-A + B + D - E - F = 0$$

$$-A + B - C = 0$$

$$+C + D - E - F = 0$$



$A = ?$
 $B = ?$

$$-5 + 3 + A = 0$$

$$A = 2V$$

$$A = 2V \text{ is}$$

$$-2 + 5 - 4 - B = 0$$

$$B = -1V$$