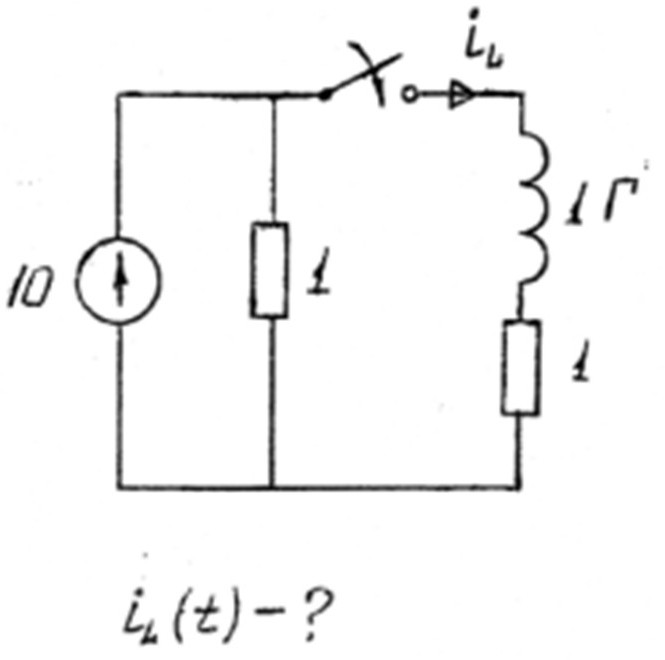
Часть III Переменный ток

# Задание 1

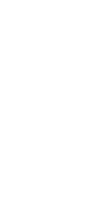
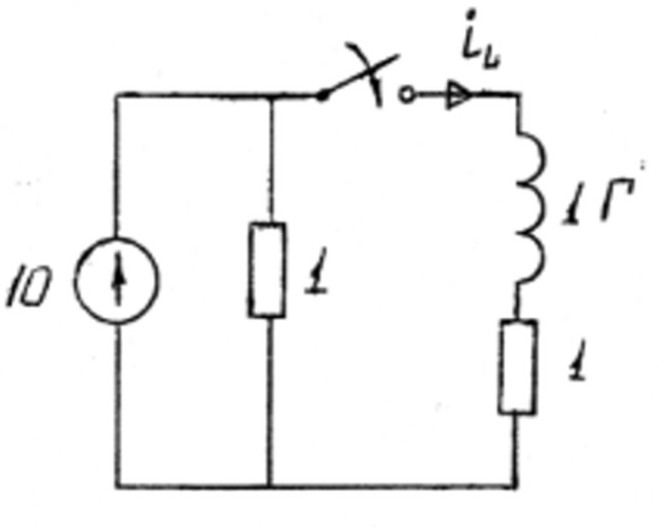
****

До коммутации:



il(+0) = il(-0)=0 i1(-0)=E/R1

iL(+0) = iL(-0)=0 UL(+0) = E iL(∞)=E/R2 UL(∞)=0



После:

𝑢L

(𝑡) = 𝐿 𝑑𝑖L

𝑑𝑡

𝑑𝑖L

𝐸 = 𝐿 𝑑𝑡 + 𝑅2𝑖L

𝑑𝑖

𝐿 𝑑𝑡 + 𝑅2𝑖 = 0

𝐿𝑝 + 𝑅2 = 0

𝑝 = −

𝐿

r =

𝑅2

𝐿

𝑅2

𝑖(∞) =

𝐸

𝑅2

𝐸 –t

𝑖L(𝑡) = 𝑅 + 𝐴𝑒 c

2

𝐸

𝑖L(+0) = 𝑅

2

+ 𝐴

𝐴 = −

𝐸

𝑅2

При t>0:

𝐸

𝑗L(𝑡) = 𝑅

2

t

(1 − 𝑒–c)

𝑈 (𝑡) = 𝐿 𝑑𝑖L

L 𝑑𝑡

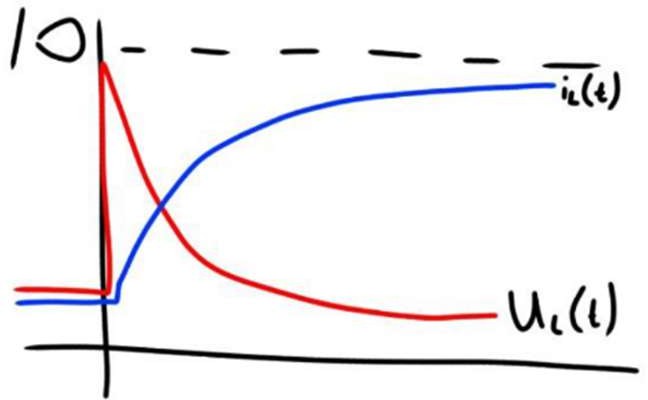
–t

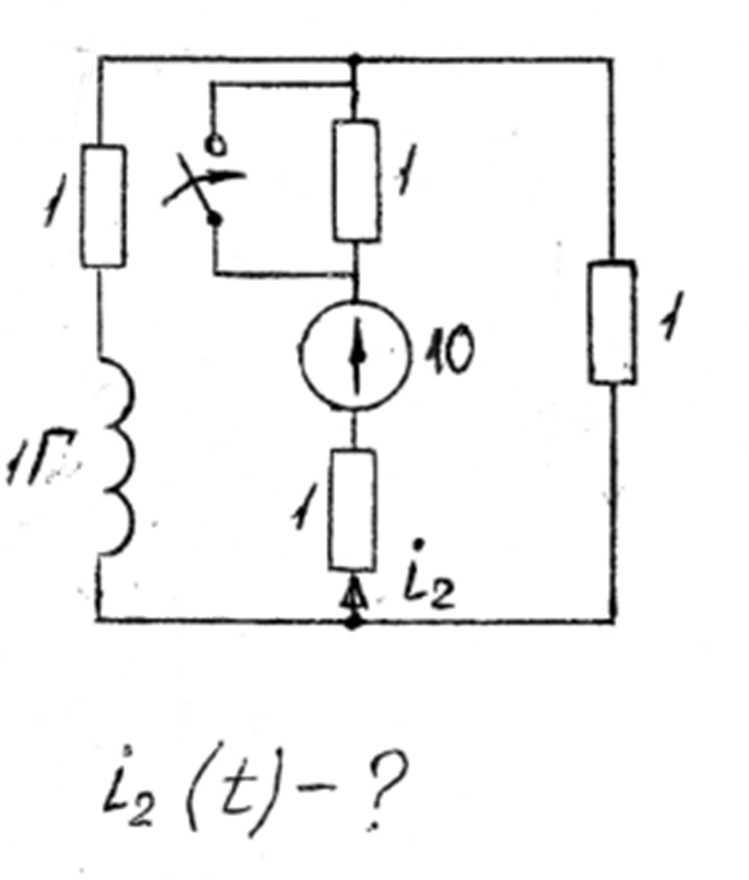
𝑈L(𝑡) = 𝐸𝑒 c

Подставим значения:

𝑖L(𝑡) = 10(1 − 𝑒–t)𝐴

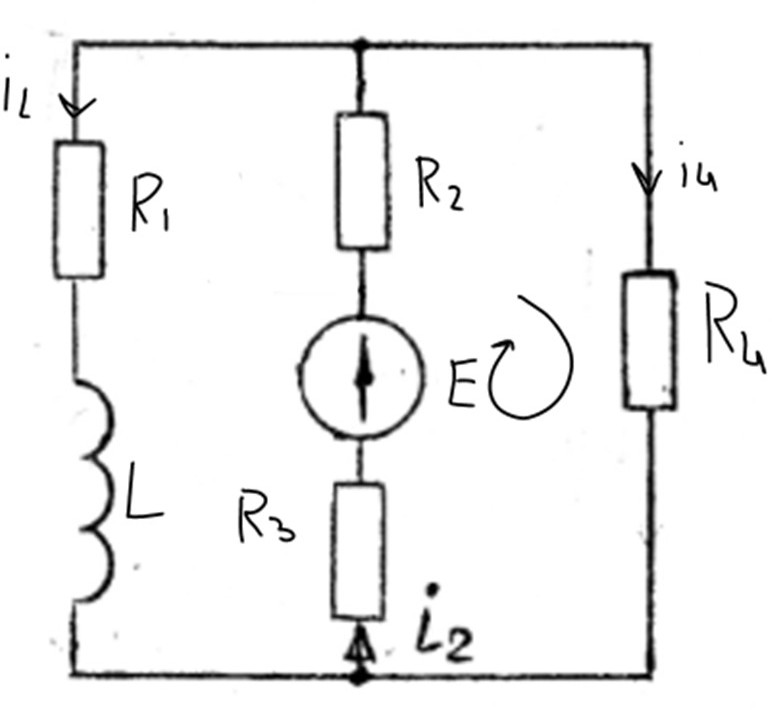
𝑈L(𝑡) = 10𝑒–t





il(+0) = il(-0)=0

До коммутации:



𝑈L(−0) = 0

𝑖L(−0) = 𝑖1(0)

# Задание 2

𝑖L

𝑖4

𝑖2

(−0) = 𝐸1

𝑅1

(−0) = 𝐸1

𝑅4

𝐸 − 𝐸1

(−0) =

𝑅2 + 𝑅3

𝐸1

𝐸1

𝑖2 = 𝑖L + 𝑖4 = 𝑅

1

+

𝑅4

𝐸1 =

𝐸

1 1

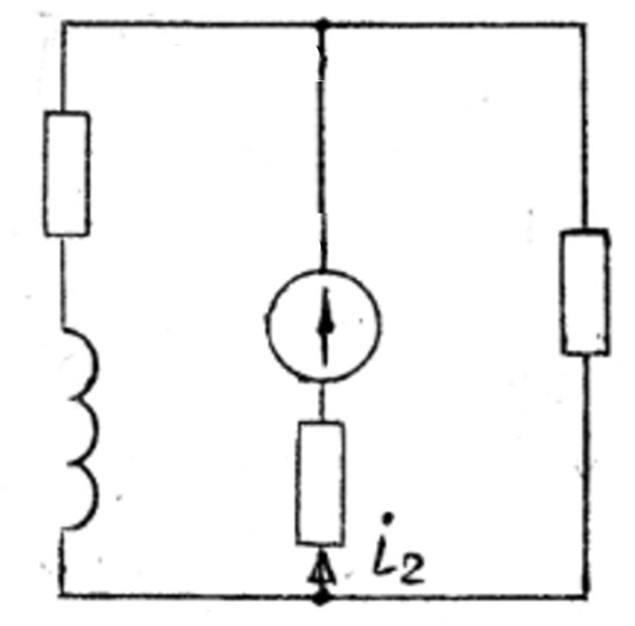
𝑖L

1 + (𝑅2 + 𝑅3) (𝑅 + 𝑅4)

(−0) = 𝐸1

𝑅1

После коммутации:



𝑢(𝑡) = 𝑅1𝑖L(𝑡) + 𝑢L(𝑡)

𝑢L

(𝑡) = 𝐿 𝑑𝑖L

𝑑𝑡

𝑢(𝑡)

𝑖4(𝑡) =

𝑅4

𝐸 − 𝑢(𝑡)

𝑈(𝑡) = 𝐸 − 𝑖2(𝑡)𝑅3 → 𝑖2(𝑡) =

𝑖2(𝑡) = 𝑖L(𝑡) + 𝑖4(𝑡)

𝑑𝑖L

𝑈L = 𝐿 𝑑𝑡

𝑅3

𝐸 − 𝑢

= 𝑖

𝑢

+ → 𝐸 = 𝑅 𝑖

+ 𝑈 (1 + 𝑅3)

𝑅3

2 𝑅4 3 L

𝑅4

𝑅4

𝑢(𝑡) = (𝐸 − 𝑅 𝑖

(𝑡))

𝑅3 + 𝑅4 3 L

𝑈(𝑡) = 𝑅1𝑖L

𝑑𝑖L

+ 𝐿

𝑑𝑡

𝑑𝑖L 𝑅4

𝑅 𝑖 + 𝐿 = (𝐸 − 𝑅 𝑖 )

1 L

𝑑𝑖L

𝑑𝑡

𝑅3 + 𝑅4

𝑅4𝑅3

3 L

𝑅4

𝐿 𝑑𝑡 + (𝑅1 + 𝑅

3

3

+ 𝑅4

)𝑖L = 𝑅

𝐸

+ 𝑅4

𝐸' = R4 𝐸; 𝑅 = 𝑅 + R4R3

R3+R4

1 R3+R4

𝑑𝑖

𝐿 + 𝑅

= 0 → 𝑖 = 𝐴𝑒pt

𝑑𝑡 i

𝑅 𝐿

𝐿p + 𝑅 = 0 → 𝑝 = − 𝐿 ; r = 𝑅

–t

𝑖L(𝑡) = 𝑖L(∞) + 𝐴𝑒 c

𝑖L(+0) = 𝑖L(∞) + 𝐴

При t>0:

𝑖L(𝑡) = 𝑖L(∞) + (𝑖𝐿(–0)

t

− 𝑖L(∞)𝑒–c)

𝑈L(𝑡) = −𝑅 (𝑖l(−0) − 𝑖L(∞)𝑒

–t

c) 𝑈L(∞) = 0

10

𝑖 (−𝑙) =

4 –1.5t

L −  𝑒

3 3

𝑈(𝑡) = 2𝑒–1,5t

