8.14 Main question

A picture containing chart

Description automatically generated

Given vs = 80 V, r1= 30 Ω, r2= 5 Ω, c = 0.5 F, l= 4 H

Find

Variables

Random variables

vs = {10:100};

r1 = {20:40};

r2 = {1:5};

c = {0.1:0.5:0.1};

Global variables

#vs = 80; r1 = 30; r2 = 5; c = 0.5;

l = 4; time = 1;

# t = 0-

vc0 = 0;

# t = 0+

alpha = r2/(2\*l);

w0 = 1/sqrt(l\*c);

wd = sqrt(w0\*w0-alpha\*alpha);

A1 = vc0;

A2 = ((-vs/(r1+r2))/c)/wd;

vct = (A1\*cos(wd\*time) + A2\*sin(wd\*time))\*exp(-alpha\*time);

Part (กรอกคำตอบ)

1. *vc*(0-) = vc0 = 0 V

2. *vc*(0+) = vc0 = 0 V

3. *α* = alpha = 0.625 s^-1

4. *ω*0 = w0 = 0.707 rad/s

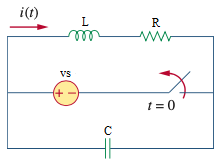
At *t* > 0

5. *vc*(*t*) = (A1\*cos(wd\*t) + A2\*sin(wd\*t))\*exp(-alpha\*t)

= (-13.82\*sin(0.33\*t))\*exp(-0.625\*t) V

6. *vc*(time*τ*) = vct = -2.39 V

8.20 Main question



Given vs = 30 V, r = 2 Ω, c = 1/4 F, l= 1/2 H

Find

Variables

Random variables

vs = {10:30};

r = {1:2};

l = {0.5:5:0.5};

Global variables

#vs = 30; r = 2; c = 0.25;

l = 0.5; time = 1;

# t = 0-

il0 = vs/r;

vc0 = -vs;

# t = 0+

alpha = r/(2\*l);

w0 = 1/sqrt(l\*c);

wd = sqrt(w0\*w0-alpha\*alpha);

A1 = il0;

A2 = ((-1/l)\*(r\*il0+vc0)+alpha\*A1)/wd;

ilt = (A1\*cos(wd\*time) + A2\*sin(wd\*time))\*exp(-alpha\*time);

Part (กรอกคำตอบ)

1. *il*(0-) = il0 = 15 A

2. *il*(0+) = il0 = 15 A

3. *α* = alpha = 2 s^-1

4. *ω*0 = w0 = 2.828 rad/s

At *t* > 0

5. *il*(*t*) = = (A1\*cos(wd\*t) + A2\*sin(wd\*t))\*exp(-alpha\*t)

= (15\*cos(2\*t) + 15\*sin(2\*t))\*exp(-2\*t) A

6. *il*(time*τ*) = ilt = 1 A

8.18 Main question

A picture containing chart

Description automatically generated

Given vs = 100 V, r1= 5 Ω, r2= 1 Ω, c = 1 F, l= 1/4 H

Find

Variables

Random variables

vs = {50:100:10};

r1 = {2:5};

r2 = {5:15};

c = {0.25:1:0.25};

Global variables

#vs = 100; r1 = 5; r2 = 1; c = 1;

l = 1/4; time = 1;

# t = 0-

il0 = vs/r1;

vc0 = 0;

# t = 0+

alpha = 1/(2\*r2\*c);

w0 = 1/sqrt(l\*c);

wd = sqrt(w0\*w0-alpha\*alpha);

A1 = vc0;

A2 = (-(vc0+(il0\*r2))/(r2\*c))/wd;

vct = (A1\*cos(wd\*time) + A2\*sin(wd\*time))\*exp(-alpha\*time);

Part (กรอกคำตอบ)

1. *vc*(0-) = vc0 = 0 V

2. *vc*(0+) = vc0 = 0 V

3. *α* = alpha = 0.5 s^-1

4. *ω*0 = w0 = 2 rad/s

At *t* > 0

5. *vc*(*t*) = (A1\*cos(wd\*t) + A2\*sin(wd\*t))\*exp(-alpha\*t)

= (-10.328\*sin(1.936\*t))\*exp(-0.5\*t) V

6. *vc*(time*τ*) = vct = -5.85 V

8.25 Main question

Schematic

Description automatically generated with medium confidence

Given vs = 30 V, r1= 2 Ω, r2= 8 Ω, c = 1/4 F, l= 1 H

Find

Variables

Random variables

#l < 4\*r\*r\*c Parallel, c < 4\*r\*r/l Series

vs = {10:20};

r1 = {2:5};

r2 = {8:15};

c = {2:5};

Global variables

#vs = 30; r1 = 2; r2 = 8; c = 1/4;

l = 1; time = 1;

# t = 0-

il0 = vs/(r1+r2);

vc0 = r2/(r1+r2)\*vs;

# t = 0+

rth = r2;

alpha = 1/(2\*rth\*c);

w0 = 1/sqrt(l\*c);

wd = sqrt(w0\*w0-alpha\*alpha);

A1 = vc0;

A2 = alpha/wd\*A1;

vct = (A1\*cos(wd\*time) + A2\*sin(wd\*time))\*exp(-alpha\*time);

Part (กรอกคำตอบ)

1. *vc*(0-) = vc0 = 24 V

2. *vc*(0+) = vc0 = 24 V

3. *α* = alpha = 0.25 s^-1

4. *ω*0 = w0 = 2 rad/s

At *t* > 0

5. *vc*(*t*) = (A1\*cos(wd\*t) + A2\*sin(wd\*t))\*exp(-alpha\*t)

= (24\*cos(1.98\*t) + 3.02\*sin(1.98\*t))\*exp(-0.25\*t) V

6. *vc*(time*τ*) = vct = -5.279 V