# Content

[Content 0](#_Toc64213905)

[Accelerated motion 1](#_Toc64213906)

[Resistor 1](#_Toc64213907)

[Secant method 2](#_Toc64213908)

[Regula falsi method 2](#_Toc64213909)

[DC circuit R and ε 3](#_Toc64213910)

[Kinematics optimization(?) 3](#_Toc64213911)

[E around a wire 4](#_Toc64213912)

[E due to finite line charge 4](#_Toc64213913)

[E of semi-infinite line of charge 4](#_Toc64213914)

[E of infinite line of charge 5](#_Toc64213915)

[E infinite consentric wire Gauss 5](#_Toc64213916)

[E infinite wire Gauss 6](#_Toc64213917)

[dl, da, dV in cylindrical CS 6](#_Toc64213918)

[Spherical cs 7](#_Toc64213919)

[dl, dA, dV in spherical cs 7](#_Toc64213920)

[dl, dA, dV in cartesian cs 8](#_Toc64213921)

[enclosed charge 8](#_Toc64213922)

[Spherical AGauss point charge 8](#_Toc64213923)

[Rectangular AGauss point charge 9](#_Toc64213924)

[Notes and version 9](#_Toc64213925)

# Accelerated motion

*t* = *t*2

*x* = *x*2

*t* = *t*3

*x* = *x*3

*t* = *t*1

*x* = *x*1

*t* = 0

*x* = *x*0

*v*0

  

# Resistor

# Secant method

Start

*f*(*x*), *x*1, *x*2, *ε*

*n* = 1

2

1

*c* < ε

*c* = | *f*(*xn*+2)|

2

1

*n* = *n* + 1

N

*x*root *= xn*+2

*x*root

End

Y



# Regula falsi method

Start

*f*(*x*), *x*1, *x*2, *ε*

*n* = 1

2

1

*c* < ε

*c* = | *f*(*xn*+2)|

2

1

*n* = *n* + 1

N

*x*root *= xn*+2

*x*root

End

Y



# DC circuit R and ε

*R*1

*R*2

*R*3

*R*4

*R*5

*R*6

*R*7

*R*8

*ε*1

*ε*3

*ε*2

*I*1

*I*2

*I*1 + *I*2

*I*1

*I*2

*I*3

*I*3

*I*1

*I*1

*I*1 – *I*3

*I*1 – *I*3

*I*2 + *I*3

*I*2

*I*2

*I*3

*I*3

*I*3

*I*3

*I*3

*I*3

*I*2 + *I*3

*I*1 + *I*2

*a*

*b*

*c*

*d*

# Kinematics optimization(?)

*A*1

*A*2

*A*3

0

*t*1

*t*2

*t*3

*v*max

*v*

*t*

   

   

  

 









# E around a wire

*λ*, *L*



*o*

*l*

*L*

*s*

*b*

*λ*, *L*



*o*

*r*

*θ*

*r*

*l*

*b*

*θ*

*λ*, *L*



*o*

*l*

*L*

*s*

*b*

*x* = *a*

*a* + *L* = *x*

*x* = *a* + *s*

(a)

(b)

(c)

(d)

*x*

*y*

*z*

# E due to finite line charge

*x*

*y*

*z*

*x* = *a* + *L*

*x* = *a*

*L*

*dqj*

*λ*



*l*

*λ*, *L*



*o*

*l*



*o*

*x* = *a* + *s*



*s*

*s*



*x* = *a*

# E of semi-infinite line of charge

*l*

*λ*, *L* → ∞



*o*

∞

*l*

*λ*, *L* → ∞



*o*

∞

# E of infinite line of charge

*λ*, ½ *L* → ∞



*o*

∞

*λ*, ½ *L* → ∞

–∞

*l*

# E infinite consentric wire Gauss

∞

–∞



*λ*

∞

–∞



*λ*

∞

–∞



*λ*

*z*

*x*

*y*



*y*

*x*

*z*



# E infinite wire Gauss

∞

–∞



*λ*

*z*

*x*

*y*



# dl, da, dV in cylindrical CS

*y*

*z*

*x*

*z*

*θ*

*r*



*dz*



*rdθ*

*r*

*dθ*



*dr*

*`*

*y*

*z*

*x*

*z*

*θ*

*r*



*dz*

*rdθ*



*r*

*dθ*

*dz*

*dr*

*dr*

*rdθ*



*y*

*z*

*x*

*z*

*θ*

*r*



*dz*

*rdθ*

*dr*

*dθ*

*r*

# Spherical cs

*θ*

*y* = *r*sin*θ*sin*φ*

*r*sin*θ*

*φ*

*r*cos*θ* = *z*

*r*sin*θ*

*r*sin*θ*cos*φ* = *x*

*r*

*x*

*y*

*z*

*z*

*x*

*r*

*x*

*y*

*z*

*y*

*φ*

*θ*

*θ*

*z*

*r*sin*θ*

*r*

*z*

*φ*

*r*sin*θ*

*y*

*x*

*x*

*y*



# dl, dA, dV in spherical cs

*θ*

*φ*

*z*

*x*

*r*

*x*

*y*

*z*

*y*

*z*

*θ*

*rdθ*

*x*

*y*

*dr*

*dφ*

*r*

*dθ*

*r*

*r*sin*θdφ*

*r*sin*θ*

*z*

*θ*

*rdθ*

*x*

*y*

*z*

*dr*

*dφ*

*r*

*dθ*

*r*

*r*sin*θdφ*

*r*sin*θ*

*r*sin*θdφ*

*dθ*

*rdθ*

*x*

*y*

*dr*

*dφ*

*dr*



*r*sin*θdφ*

*rdθ*

*dφ*

*z*

*θ*

*rdθ*

*x*

*y*

*z*

*dr*

*dφ*

*r*

*dθ*

*r*

*r*sin*θdφ*

*r*sin*θ*

*r*sin*θdφ*

*rdθ*

*x*

*y*

*dr*

*dφ*

*dθ*

*r*

# dl, dA, dV in cartesian cs

*x*

*y*

*z*

*dy*

*dz*

*dx*

*x*

*y*

*z*

*dy*

*dz*

*dx*

*dx*

*dz*

*dy*

*x*

*y*

*z*

*dy*

*dz*

*dx*

# enclosed charge

*Q*

*q*enc*= Q*

*q*enc*=* ½*Q*

*A*Gauss

*A*Gauss

# Spherical AGauss point charge



# Rectangular AGauss point charge



# Notes and version

* 130% (Jekyll + MathJax), save as 0000x first then save as back to 0000, remove 0000x then, x = i
* 20210209