2 calculus individual task:

3. Solve: ay'' + my' + Ly = kt

For complex roots of the characteristic equation:

Explanation and solution:

n is your student number.

k = n mod 10000.

T = n mod 100.

a = n mod 25.

m = n mod 35.

L = n mod 10.

If the discriminant then the roots of the quadratic equation are complex numbers.

A complex number ***z*** is represented in the form: ***z*** = R+*i*G.

Here = imaginary one, R and G are real numbers.

R is the real component of ***z*** and G is the imaginary component of ***z***.

In this case the roots of the characteristic equation

are complex numbers:

z1=R1+*i*G1

z2=R2+*i*G2

Here = imaginary one, R1, R2, G1, G2 are real numbers.

R1 is the real component and G1 is the imaginary component of z1.

R2 is the real component and G2 is the imaginary component of z2.

Because all the coefficients (a, m, L) in the quadratic equation are real numbers, the roots of this quadratic equation will be complex conjugate the proof of this can be easily seen from the solution of the quadratic equation using imaginary one ***i***.

If the roots of the equation are complex then they will be complex conjugate, which means that R1= R2 = R and G1 = - G2 = G.

Thus,

z1=R+*i*G

z2=R-*i*G

Code:

n = 15108066

a = n Mod 25

m = n Mod 35

L = n Mod 10

R = -m / (2 \* a)

G = Sqr(4 \* a \* L - m ^ 2) / (2 \* a)

MsgBox R

MsgBox G

Solution:

The general solution of the homogeneous differential equation

ay'' + my' + Ly =0

is

Here we use Euler formula:

Now you must find any solution of the non-homogeneous differential equation:

ay'' + my' + Ly = kt.

You look for such solution in the form:

p.

Here s and p are the real constants, which will be determined by substituting the expression p into the differential equation ay'' + my' + Ly = kt.

After such substation we will get:

ms+L(st+p)=kt

tLs+ms+Lp = kt

Equation the factors of the corresponding powers of t, we get:

Ls=k

ms+Lp =0

Then

Here are real arbitrary constants.