0 to 300)

Because here in this program:

initial time = **0** and final time = **300**.

A plot of the difference between the two initial conditions will help us to choose the range.

d] Place the sender.txt, cipher.txt and decoded.txt in the same location.

- Write our secret information to the 'sender.txt' file and save it.
- Run the program
- Check the 'cipher.txt' file
- 'decoded.txt' file decode the cipher text.

First step is to generate the ASCII code corresponding to the plain text (Plain text is saved in a text file). Then Set the initial condition of the Duffing oscillator equation, say, IC_1 = 1.00 and IC_2 = 1.1(Small differences in the initial condition would results a widely diverging outcome.)Run the RK4 method for IC_1 and IC_2 Store the x values of IC1 as x1 and that of IC2 as x2.Find the difference between x_1 and x_2 and plot this for visualization. Select any region from X, Say x^1, here the selected region should match the length of the plain text.

X = [1.345, -0.253 . . .] Add the elements.

For eg: 1.345 = 1345 = 1 + 3 + 4 + 5 = 13

-0.253 = 0.253 = 0253 = 0+2+5+3 = 1

R = [13, 10 . . .]

Rdepends on the choice of region in the Duffing oscillator system. It can vary. Add the R value to the ASCII code and use the mod 127. Finally, the cipher text will be **C = (R + Q) mod 127**. Now the plain text is converted into a cipher text.In the receiver end, the same step continues up to step 7. But instead of plain text, now we have the cipher text(C).Convert the cipher text to their corresponding ASCII values using **(C - R) mod 127.** The original text can be recovered from converting this ASCII code.

7. CONCLUSION

Transmission of information through internet insists confidentiality. The requirement is that people other than the sender and receiver should not be able to read or manipulate the data. Cryptography is a technique routinely used to protect information send through internet, or any other communication techniques. Deviating from the usual cryptographic techniques based on linear mathematical equations, we investigated the use of chaos theory for creating cipher text. We used the chaotic region of Duffing oscillator and created cipher text. The advantage of this method over the other existing methods is that this cipher text cannot be decoded using any of the existing hacking methods. This is because, the chaotic oscillator equations we used is highly sensitive to initial conditions. Only the person who created the cipher text knows the secret key. We tested the security of the message we created by sending the cipher text to experts in hacking, but they could not hack that message. The coding of the message using our method ensures privacy of the information due to its high key sensitivity. Hence this method can be adopted for encryption of message for various types of communications through internet and even for military applications.

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