CS-201

Computational Physics

Lab-4

28 . 02 . 2020

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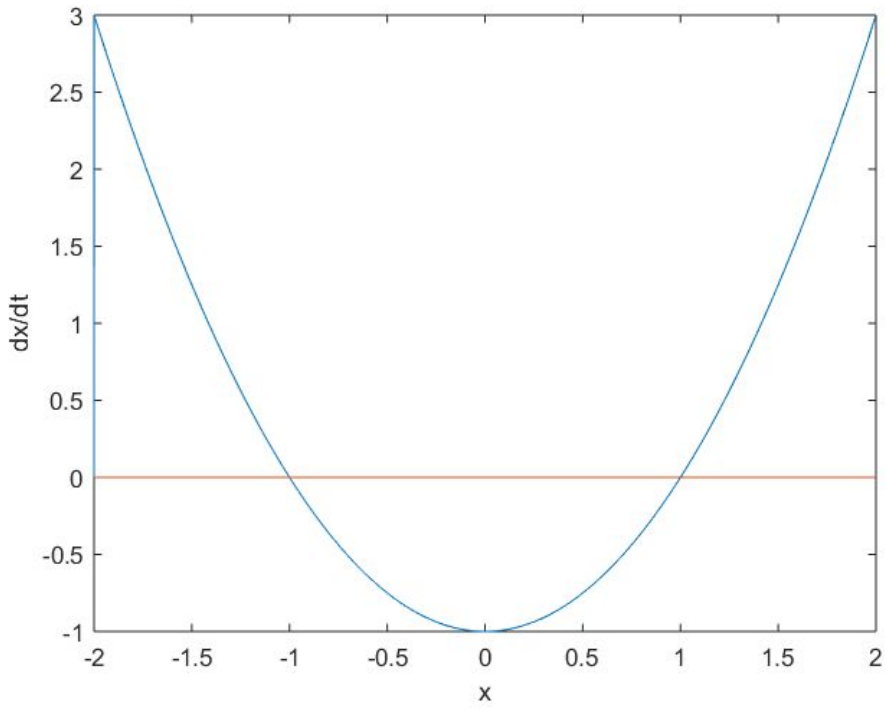
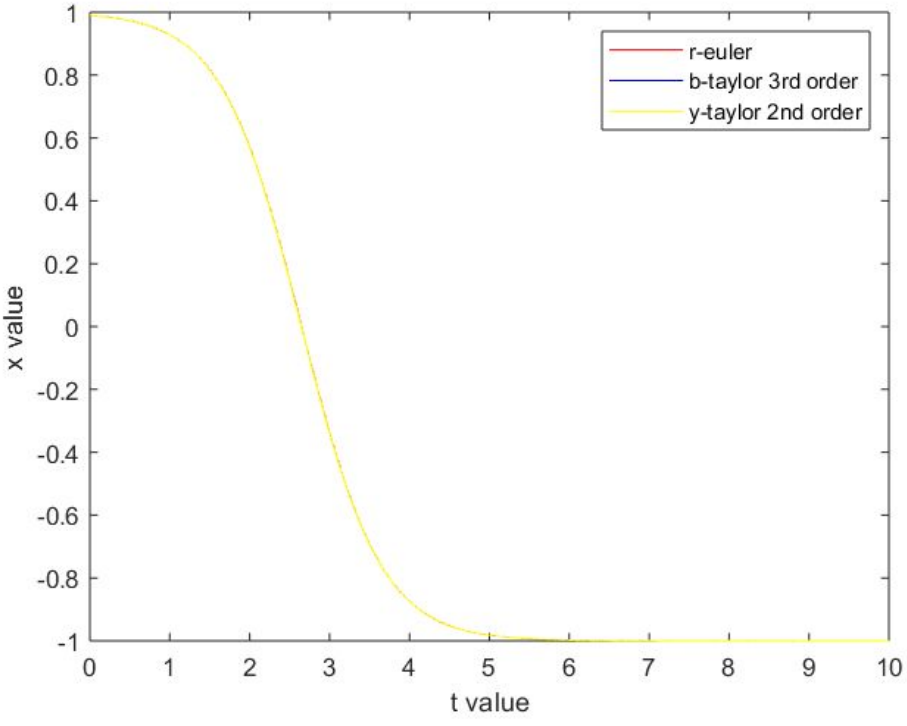
4 Phase plot of First - Order Autonomous Systems

4.a $f(x) = x^2 - 1$; $x(0) = 0.99$; $0 \leq t \leq 10$, $\Delta t = 0.001$

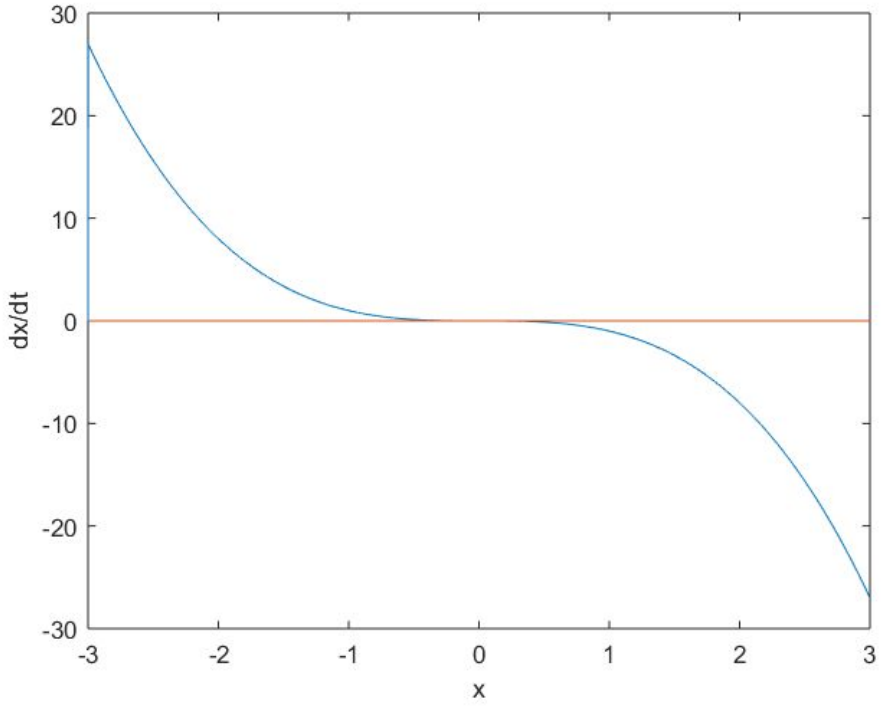
Stable Point approached : *-1*

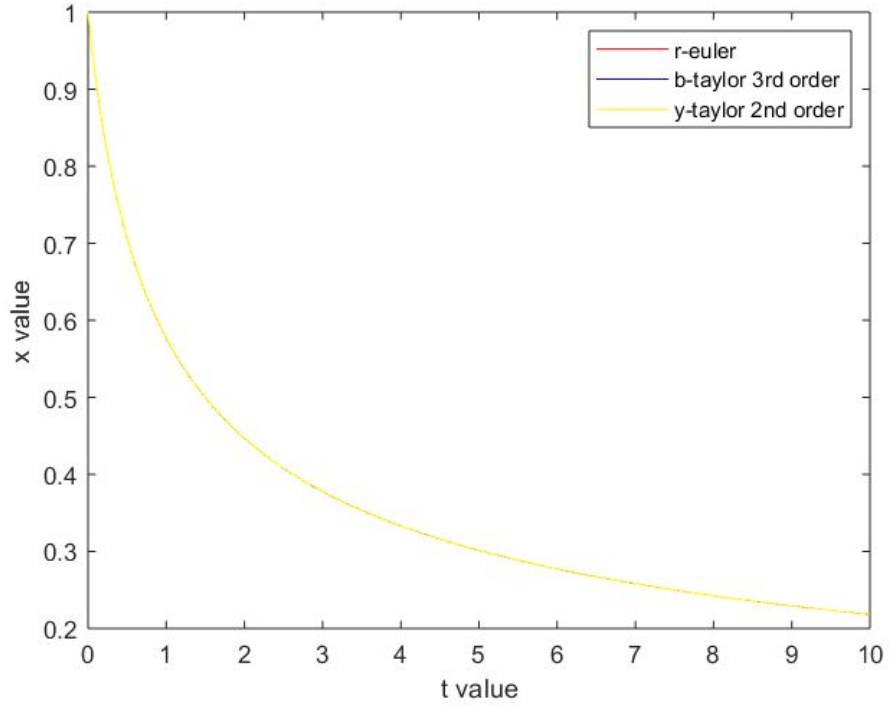




4.b $f(x) = -x^3$; $x(0) = 1$; $0 \leq t \leq 10$, $\Delta t = 0.001$

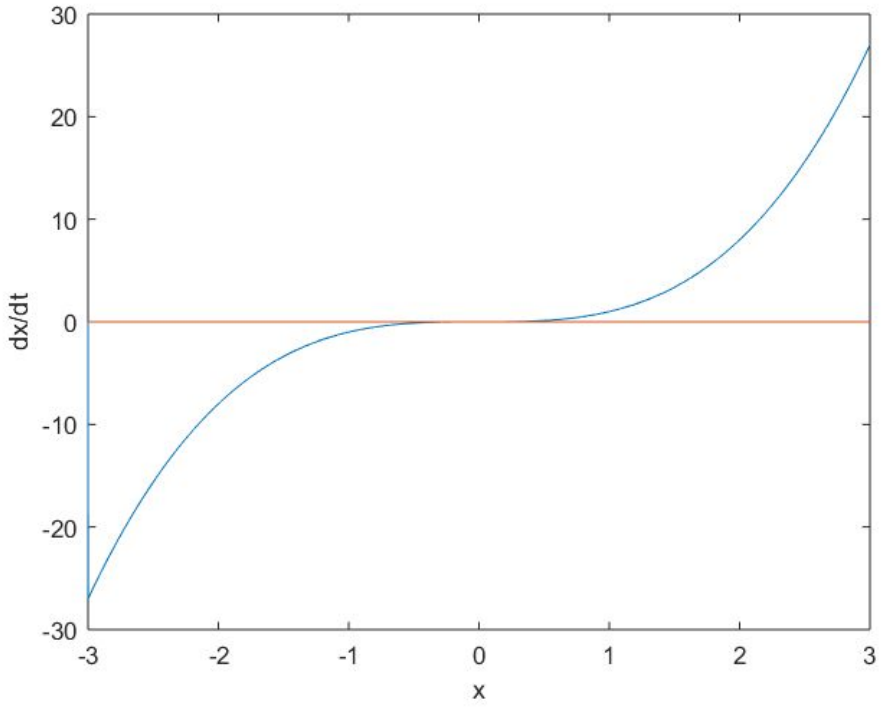
Stable Point approached: 0

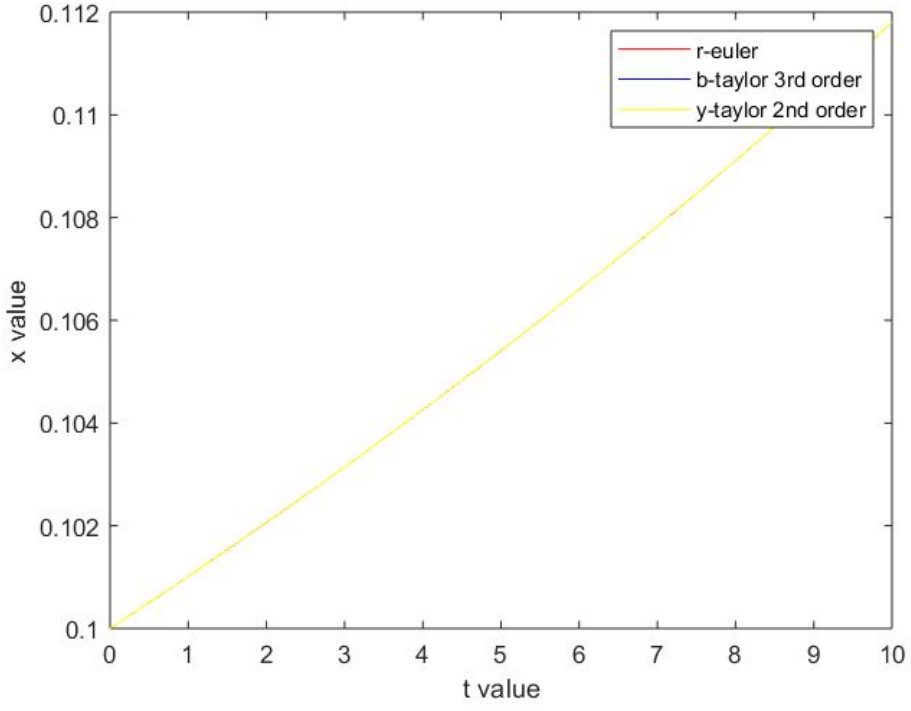




4.c $f(x) = x^3$; $x(0) = 0.1$; $0 \leq t \leq 10$, $\Delta t = 0.001$

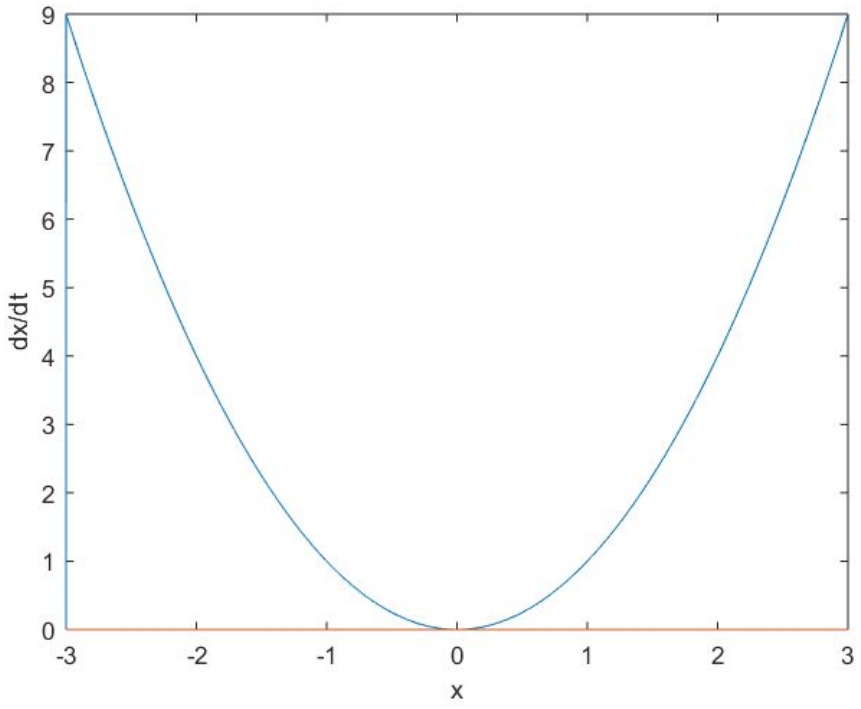
Stable Point approached: No Stable Point

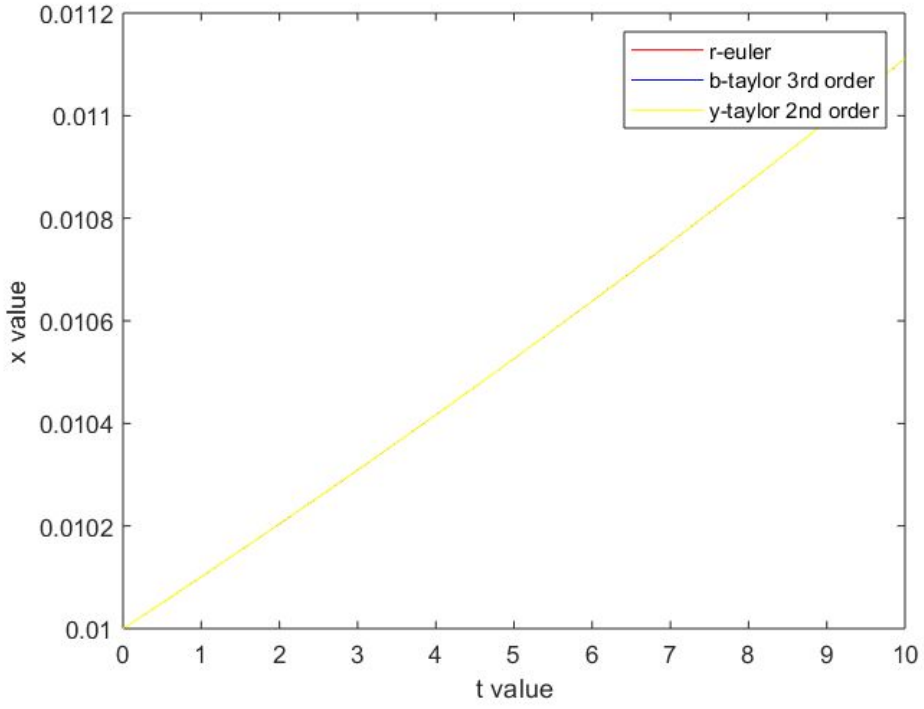




4.d $f(x) = x^2$; $x(0) = 0.01$; $0 \leq t \leq 10$, $\Delta t = 0.001$

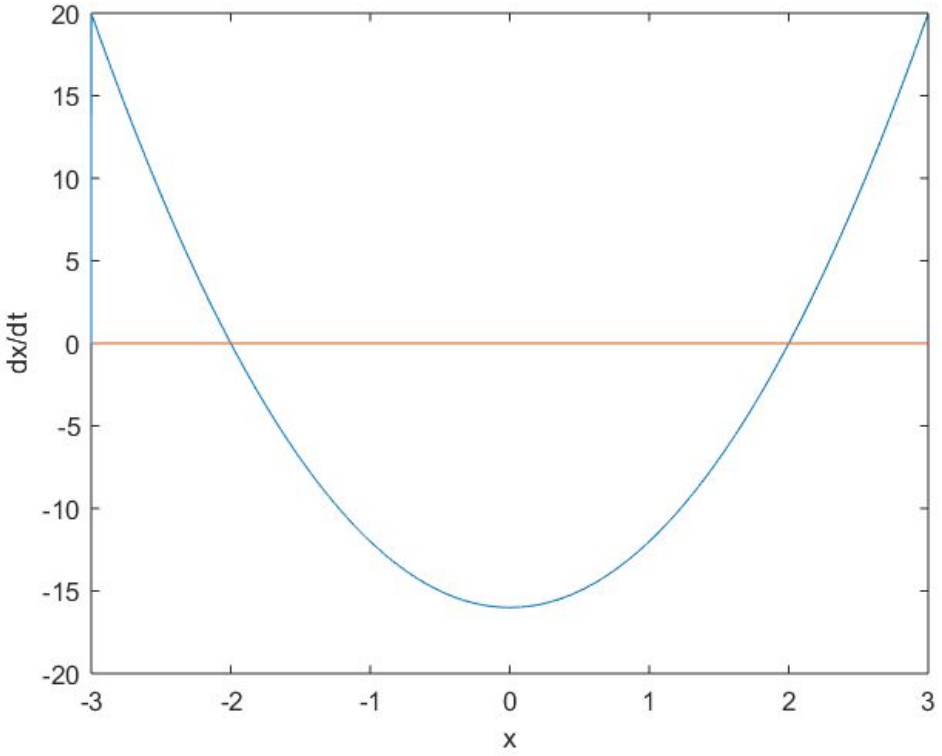
Stable Point approached: *No Stable Point*

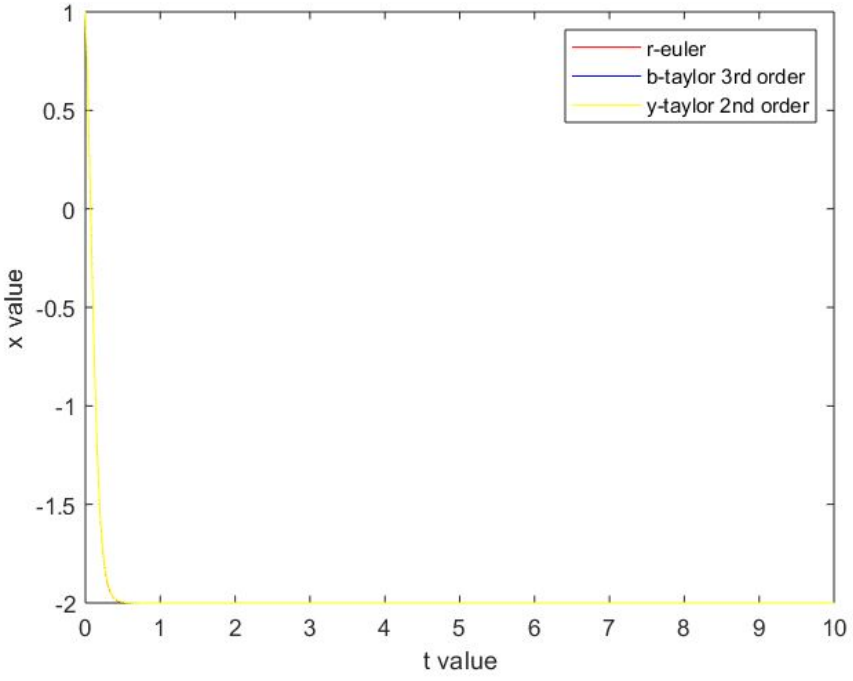




4.e *$f(x) = 4x^2 - 16$; $x(0) = 1$; $0 \leq t \leq 10$, $\Delta t = 0.001$*

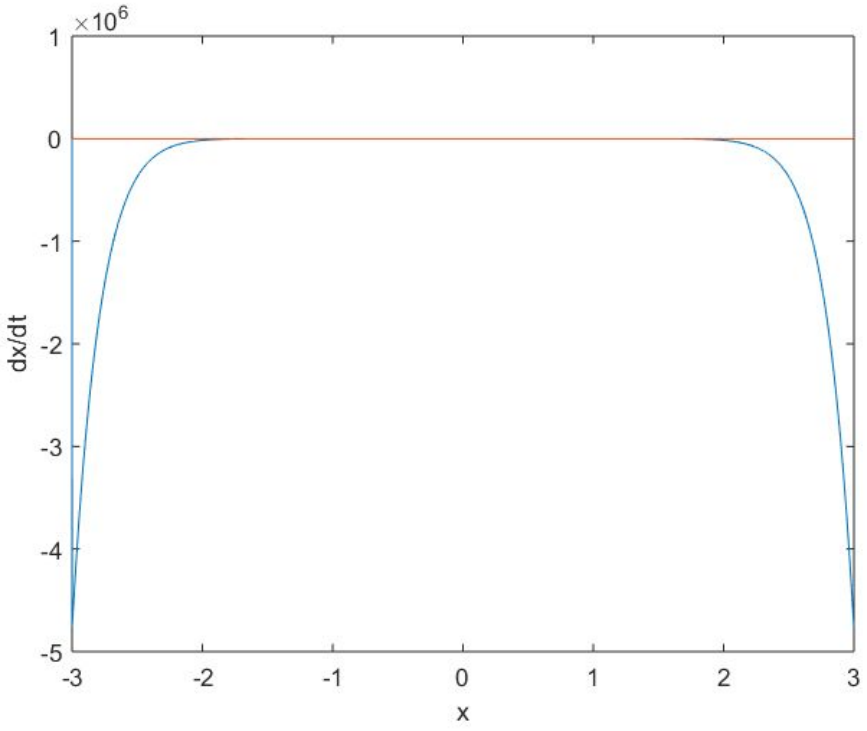
Stable Point approached: *-2*

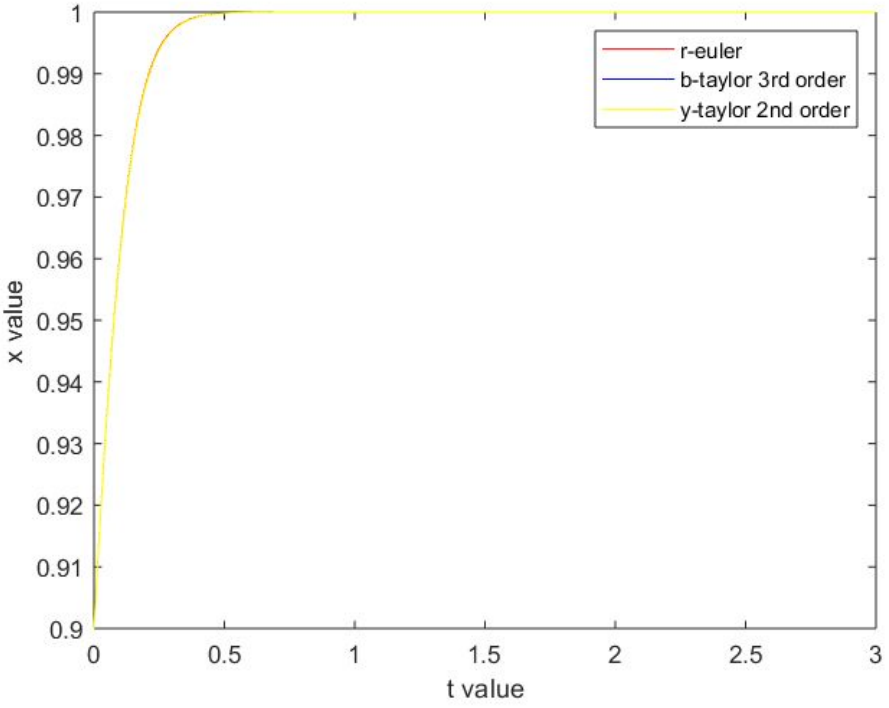




4.f *f(v) = 1 - x^{14} ; x(0) = 0.9 ; $0 \leq t \leq 3$, $\Delta t = 0.001$*

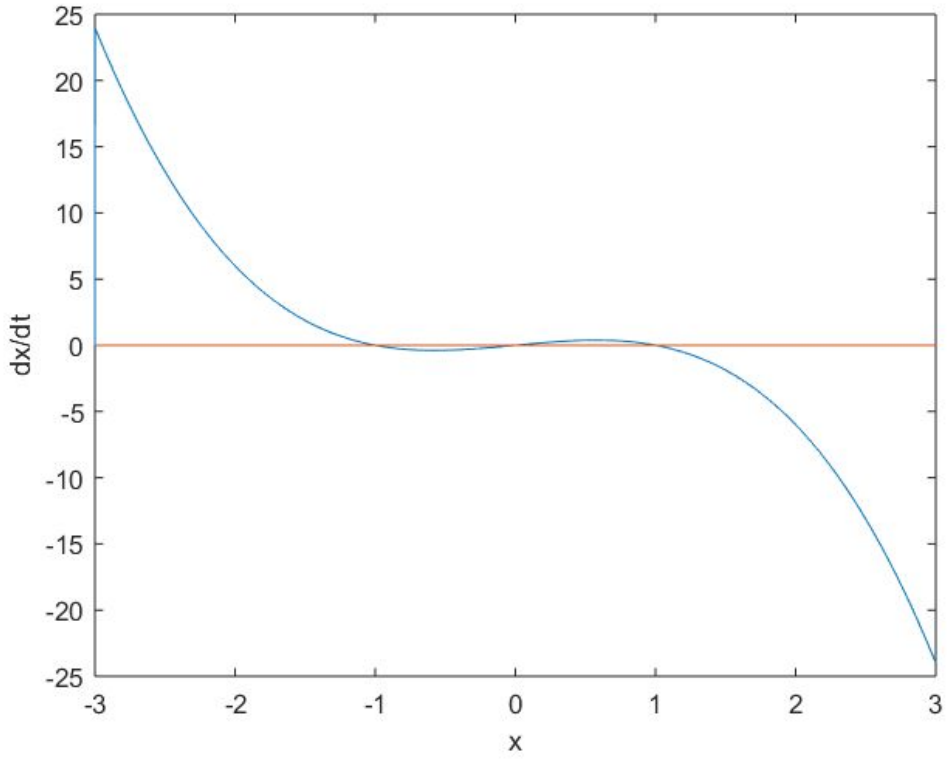
Stable Point approached: *1*

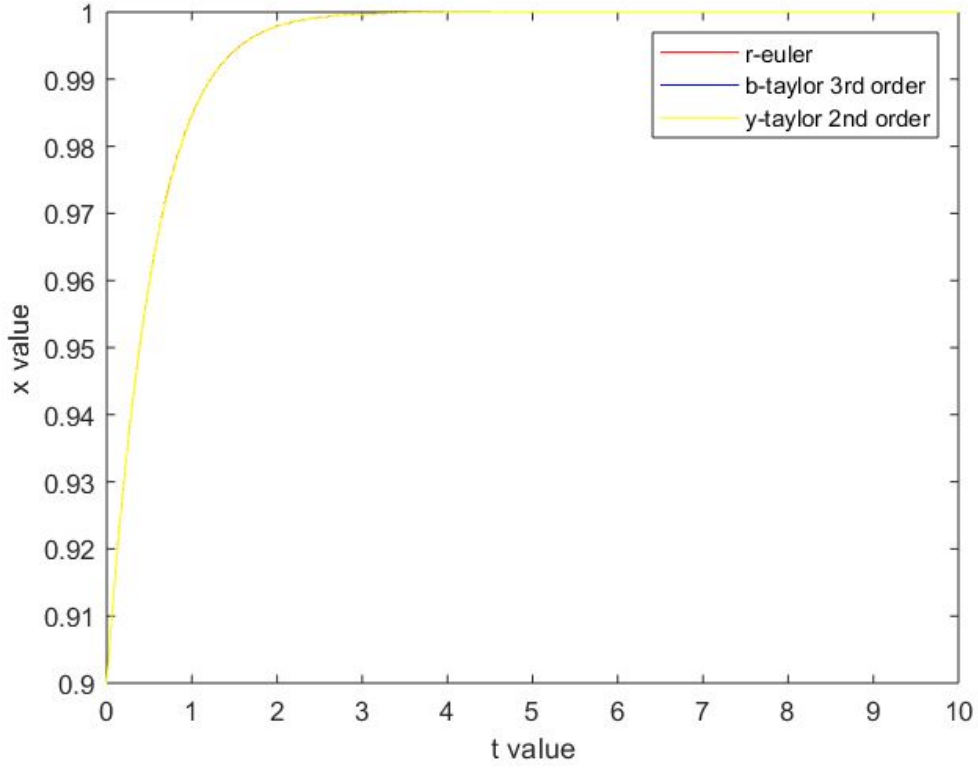




4.g *$f(x) = x - x^3$; $x(0)=0.9$; $0 \leq t \leq 10$, $\Delta t = 0.001$*

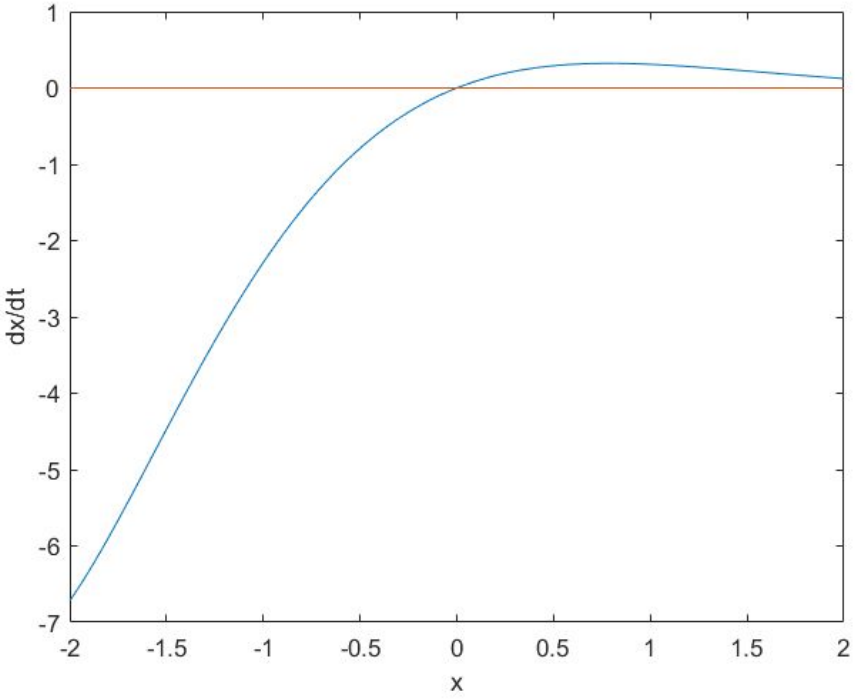
Stable Point approached: *1*

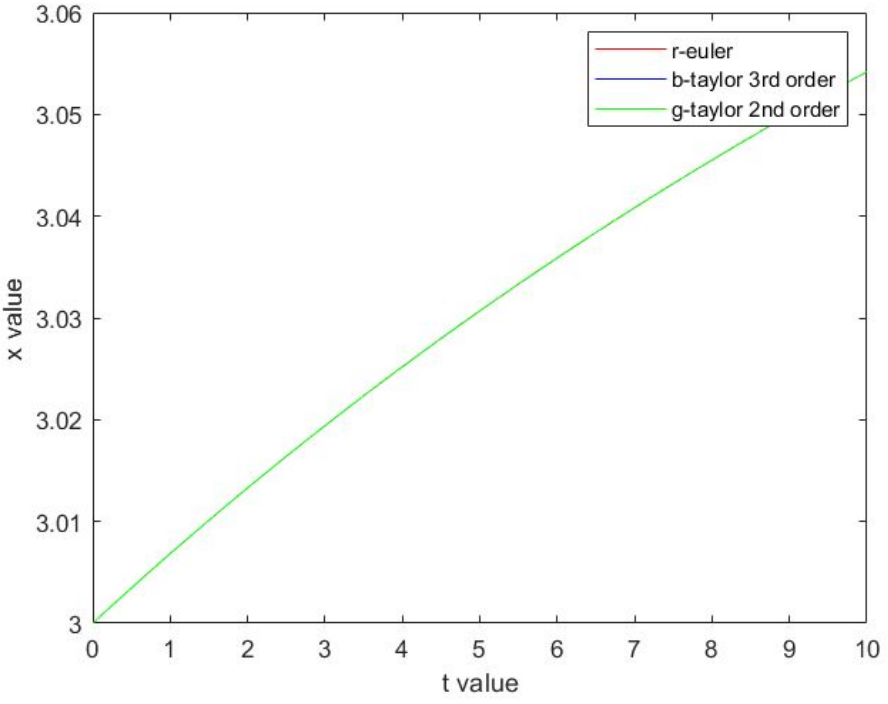




4.h *$f(x) = e^{-x} \sin(x)$; $x(0)=1$; $0 \leq t \leq 10$, $\Delta t = 0.001$*

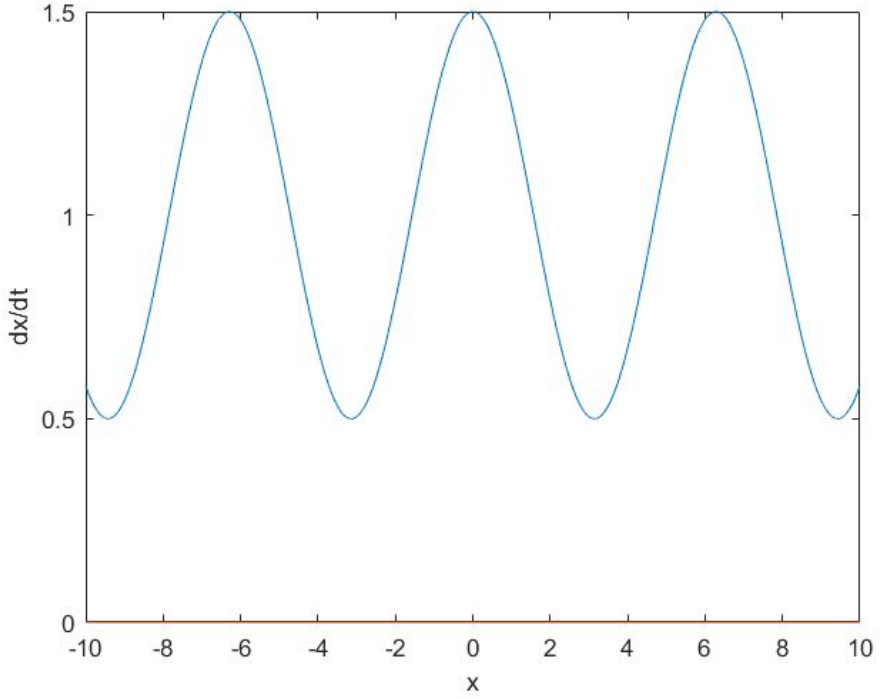
Stable Point approached: π

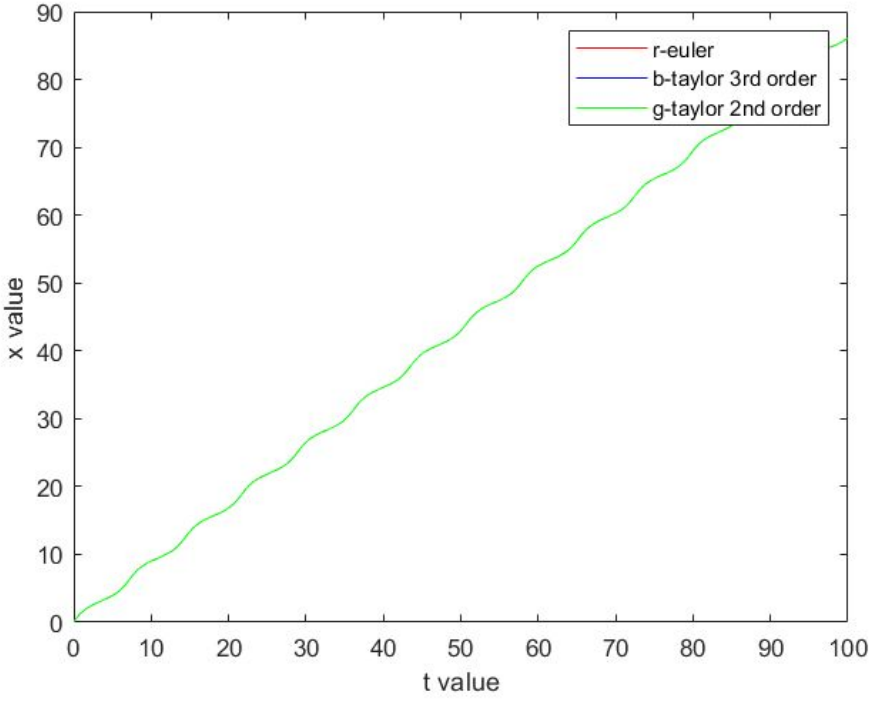




4.i *f(x) = 1 + 0.5 cos(x)* ; *x(0)=0* ; *0 ≤ t ≤ 100* , *∆t = 0.001*

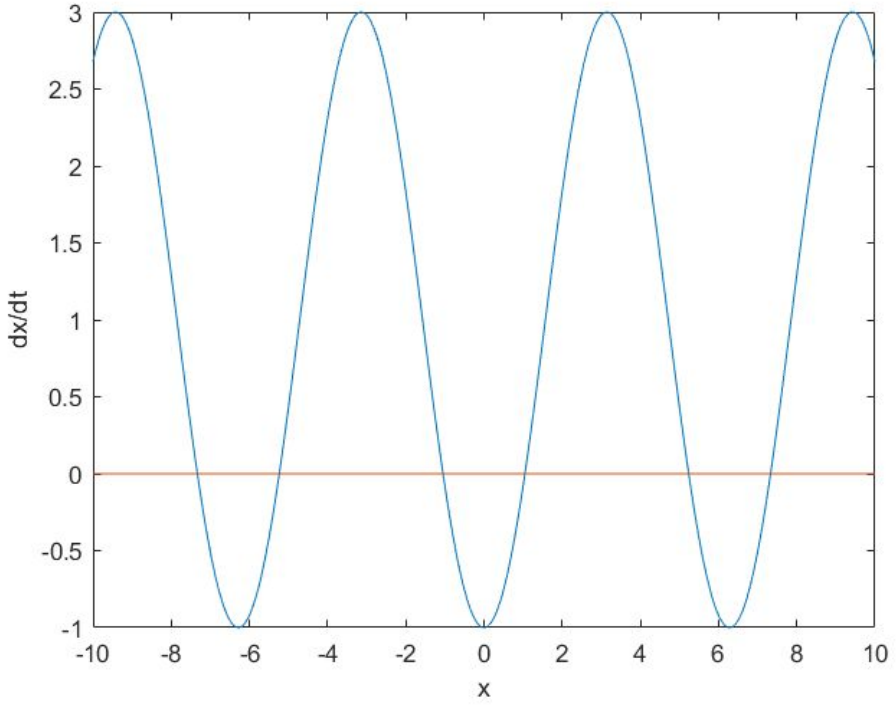
Stable Point approached : *No Stable Point*

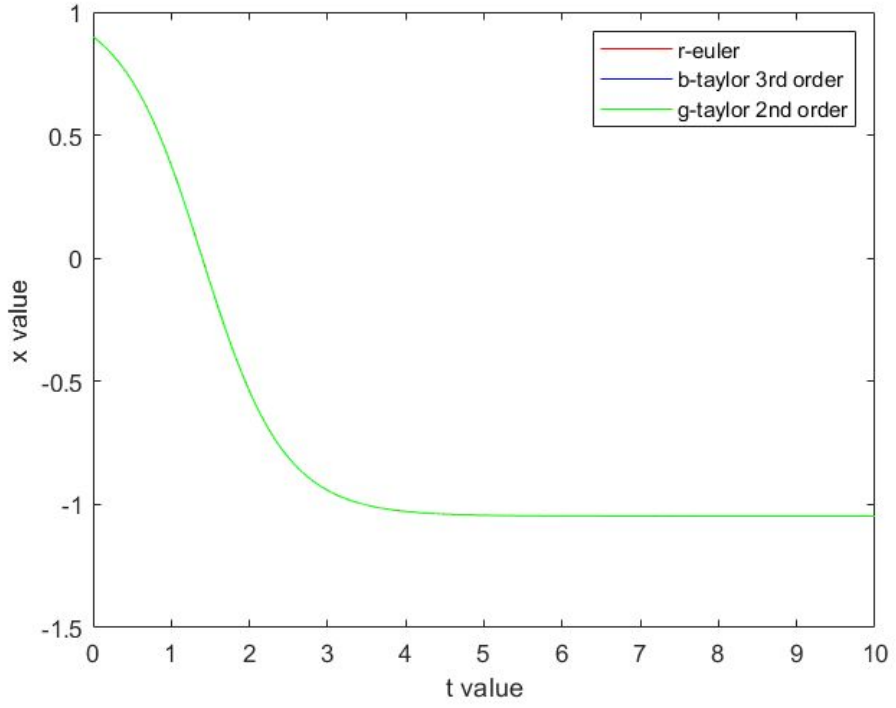




4.j *f(x) = 1 - 2 cos(x) ; x(0)=0 ; $0 \leq t \leq 10$, $\Delta t = 0.001$*

Stable Point approached: *-1*





4.k *$f(x) = e^x - \cos(x)$; $x(0)=0$; $0 \leq t \leq 10$, $\Delta t = 0.001$*

Stable Point approached: *-1.297*