

```
> # On March 15, 2023, Ivie Stein Jr. using MAPLE 2022 programmed
Newton's method for  $\text{grad}(F)=0$  where  $F$  is Rosenbrock's Banana
Valley Function. Refer to the end of this MAPLE computer program
to verify quadratic convergence. The results are the same as
those of the CGS method of Hestenes with no derivatives and no
line searches for function minimization.
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```
> restart;
```

```
> Digits:=150;
```

Digits := 150

(1)

```
> with(Student[LinearAlgebra]):
```

```
> x:=<-1.2,1>:
```

```
for i from 1 to 9 do
```

```
Jacobian:=<-400*(x[2]-x[1]^2)+800*x[1]^2+2,-400*x[1];-400*x[1],
200>:
```

```
Jacobian^(-1):
```

```
x:=x-(Jacobian^(-1)).<-400*x[1]*x[2]+400*x[1]^3+2*(x[1]-1),200*(x
[2]-x[1]^2)>:
```

```
print(x[1],x[2]):
```

```
y[i,1]:=x[1];y[i,2]:=x[2];
```

```
end do:
```

```
-1.17528089887640449438202247191011235955056179775280898876404494382022471910112\ (2)
359550561797752808988764044943820224719101123595505617977528089887640450,
1.380674157303370786516853932584269662921348314606741573033707865168539325842\
69662921348314606741573033707865168539325842696629213483146067415730337079
0.7631148711764698446887391435696941428681579682501159746739120817169560661390609\
021881608502365630541977758395997578120161138435207762150164134184105,
-3.1750338547481955238341997685008737921012068652007649677135000968402552208\
3448391941180775639244037286928181798182010794553238770034879676994821556248
0.7634296788840740867449241049647925404753966074277955085878739215818558932898646\
48236467479595449558836941215019378442329996188184332237589042947560453,
0.582824775497147708487268219815099320525790412676089108814007944328038145710\
58365086719420027568190171257343500711854243750403623779946717569010962391
0.9999953110849907987615066898161573229094884153091870873228268948292979487421585\
48461094883962292472279813795962719155203829111838088249239690058524891,
0.944027323853348119531028797598028624487126114932192014496159164458585814202\
469387234648854261116208872571063865963349935045169772287889689731512143422
0.9999956956536687561741244552731308256429981938650793344283312651115690473479582\
85972478761280306144137266926396221847868377683882850113483819014524771,
0.999991391325717016619475181995497741905179815905028647428144824220165871054\
096376355700816030461107979943954223099673401965269556580526937985645714462
0.9999999999999998726834030145853820832656956709285893579292035805667023399040318\
31249895065307315038424815851729603973839861090368769626987827630247944,
0.999999999981472348028609875038378336326100680138963923102325279809701030007\
```

[illegible]

