
Uppg 2.7 i Exempelsamlingen med fixpunkt

Dag Lindbo, 2011-01-25

```
clear all, close all

f = @(x) 10*x.^(1/10) - x - cos(x) - exp(-x);
G = @(x) 10*x.^(1/10) - cos(x) - exp(-x);

x = 5; % startgissning

tol = 1e-13; % tolerans
x_vec = x;
h = inf;
while abs(h) > tol
    h = x-G(x);
    x = G(x);
    x_vec = [x_vec x];
end

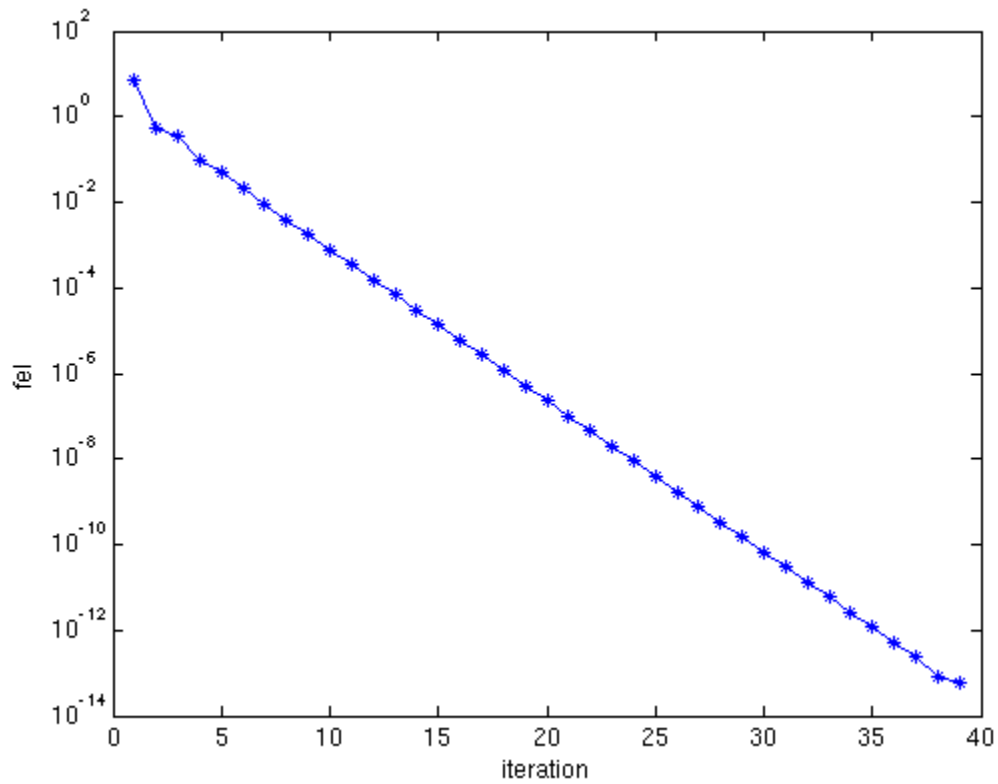
disp(f(x)) % verifiera lösningen

disp('gissningar, x_n      |x-x_n|      f(x_n)')
disp('-----')
disp([x_vec' abs(x_vec'-x) abs(f(x_vec'))]) % visa konvergensen

figure()
semilogy( abs(x_vec'-x), '*-'), xlabel('iteration'), ylabel('fel')
```

gissningar, x_n	x-x_n	f(x_n)
5.0000000000000000	6.984007394786923	6.455789298417877
11.455789298417878	0.528218096369045	0.861582185033925
12.317371483451803	0.333364088664879	0.432135692324608
11.885235791127196	0.098771603659728	0.146472624175069
12.031708415302266	0.047701020515342	0.067882903895322
11.963825511406943	0.020181883379980	0.029290625755136
11.993116137162080	0.009108742375156	0.013109750382063
11.980006386780017	0.004001008006906	0.005780164449953
11.985786551229969	0.001779156443046	0.002566055583714
11.983220495646256	0.000786899140667	0.001135770270110
11.984356265916364	0.000348871129441	0.000503379023485
11.983852886892880	0.000154507894043	0.000222968449647
11.984075855342526	0.000068460555603	0.000098788276593
11.983977067065934	0.000030327720989	0.000043764005304
11.984020831071238	0.000013436284314	0.000019388804117
11.984001442267122	0.000005952519802	0.000008589642759
11.984010031909881	0.000002637122957	0.000003805428436
11.984006226481446	0.000001168305477	0.000001685893268
11.984007912374715	0.000000517587791	0.000000746891393
11.984007165483321	0.000000229303602	0.000000330890618
11.984007496373939	0.000000101587016	0.000000146592455
11.984007349781484	0.000000045005439	0.000000064943950
11.984007414725435	0.000000019938511	0.000000028771721
11.984007385953714	0.000000008833210	0.000000012746561
11.984007398700275	0.000000003913351	0.000000005647032
11.984007393053243	0.000000001733680	0.000000002501769
11.984007395555013	0.000000000768090	0.000000001108346
11.984007394446667	0.000000000340256	0.000000000491024
11.984007394937692	0.000000000150768	0.000000000217534

11.984007394720157	0.0000000000066766	0.000000000096374
11.984007394816532	0.000000000029608	0.000000000042699
11.984007394773831	0.000000000013092	0.000000000018918
11.984007394792750	0.000000000005826	0.000000000008380
11.984007394784369	0.000000000002554	0.000000000003714
11.984007394788081	0.000000000001158	0.000000000001643
11.984007394786438	0.000000000000485	0.000000000000726
11.984007394787165	0.000000000000242	0.000000000000320
11.984007394786845	0.000000000000078	0.000000000000140
11.984007394786985	0.000000000000062	0.000000000000061
11.984007394786923	0	0.000000000000028



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