zad. 4.8

January 14, 2022

[1]:
```
using Polynomials

# p(x) = 2x^6 +  25x^5 -  4x^4 + 13x^3 + 172x^2 - 7x - 24
a = reverse(  Array{Float64,1}([ 2, 25, -4, 13, 172, -7, -24 ]) )
p = Polynomial(a)
```

[1]:
$$-24.0 - 7.0 \cdot x + 172.0 \cdot x^2 + 13.0 \cdot x^3 - 4.0 \cdot x^4 + 25.0 \cdot x^5 + 2.0 \cdot x^6$$

[2]:
```
# Metoda Steffensena
setprecision(512)

function Steff(f::Function, c0::BigFloat;  s = BigFloat(1.0e-128), imax = 10,␣
 ↪print = true)
    iter = 0;
    cr = c0;
     a = c0
    if print; @show(iter, cr,  a);  println(""); end;
    while true
        crold = cr
        iter  = iter + 1
        fr = f(cr)
        cr = cr - ((fr * fr) / (f(cr + fr) - fr))
        if cr!=0.0
            a = abs((cr-crold)/cr)
        end;
        if print; @show(iter, cr,  a); println(""); end;
        if  a< s || iter>=imax
            break;
        end
    end
    return cr,iter, a;
end;
```

[3]:
```
f(x) = exp(-x) - sin(x)

#Steff(f, BigFloat("-1.0"))

#Steff(f, BigFloat("2.0"))
```

```
Steff(f, BigFloat("4.0"))

#Steff(f, BigFloat("7.0"))
```

```
iter = 0
cr = 4.0
 a = 4.0

iter = 1
cr = 1.4030576879021165185885404756994423763745246902924413874096413598588606602
969086931219351405357551685935112671412187198951217059801512411989565693099732200
98
 a = 1.8509162769927800790502137793475076005909178243224355782803279548947157540
694504631642134854639931891380906598843767196870757977258278868892945406377240060
07

iter = 2
cr = 0.54718282081535489783545965631472427219176360168942203683128712750669128735
720743347771334840015314872317575138695558394423594378332475736879477547675409402
9
 a = 1.5641479127788148742129052154875857100026315327560941226839018946347357629
661245296104416726797766530857343838067648462752168246385323747049293348718989594
5

iter = 3
cr = 0.588809928086667125514841263825809693490896083469994432654141000907974142267
3738825598869355514385176731383835287777906914730435409735394472590096745530484286
2
 a = 0.0706970200155747376803173513068993043978340178993545761263276389068672997
8499870082843426238651976189445525274444387351110005553277250079345721728238669 5
0535

iter = 4
cr = 0.588532755876587517314812899756247412672495494479010343536134003187146302284
6827501018018200077475643331160526647880770461511428415289743652698894161250326
56
 a = 0.000470954602461803972641058276849125188028531368325195873247745092505879796
6689520118947106793108363064920566527356710001666221213239039523321679400494048
577699

iter = 5
cr = 0.588532743981861099343533255274341341014599238039805656982591357499001917121
1126670025909867628268359684513971245034971381950159842367619797920183245499736
361
 a = 2.021081501344278919202662311115251208727155528001139716991506787919769824766
3438547543247736135365853798167043253136230034997612403110576622866914717843455
9e-08
```

```
iter = 6
cr = 0.588532743981861077432452045702903762881535454741228110981860980519627814442446885657032088128893923952827391114228311688174796590634515604460803638910141922
 a = 3.72300121507712574879687120642874904845531857228476557856724368976189279658084989610981187487627205815087386220772610557040915547262914199199437915697115361e-17

iter = 7
cr = 0.588532743981861077432452045702903688531271516109030533319914299511673409398342291193168068089401610032220430962528471896859686626215557927201581024235422312
 a = 1.26331567272871594200137723880124808518051363615806806517524345188846311379418817888009493820813754068046643604452733850436304805372176609789818048101989946e-34

iter = 8
cr = 0.588532743981861077432452045702903688531271516109030533319914299511672553307351427738524061576027409562153528176982466770293849745782742957614212845066672339
 a = 1.45461913481884343185884993612015033584624833076001608962118375316357407655046826658327398103110636160022581594601734292545278776743595934386584984994788774e-69

iter = 9
cr = 0.588532743981861077432452045702903688531271516109030533319914299511672553307351427738524061576027409562153528176982466770293849745782742957500713135275429886
 a = 1.92851988189021783258667610748843241383101574357997421863527500381481709337681926515768193590394361256096412741884063605904282967302649762714974696686443356e-139)
```

[3]: (0.588532743981861077432452045702903688531271516109030533319914299511672553307351427738524061576027409562153528176982466770293849745782742957500713135275429886, 9, 1.92851988189021783258667610748843241383101574357997421863527500381481709337681926515768193590394361256096412741884063605904282967302649762714974696686443356e-139)

[ ]: