Töluleg Greining
Verkefni 6

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1 Dæmi 4.1.2

Til að leysa dæmið var eftirfarandi fall skrifað:

```
function lambda = veldaadferd(A,x,m)
    i = 0;
    x %Prentum ut x^(0), til ad sja rununa.
    while i < m
        y = A*x;
        %Finnum inf-normid med minnsta indexid.
        x = y/y(find(abs(y)==norm(y,Inf),1))
        i = i+1;
    end
    %Viljum finna eigingildid lika, til thess er adferdin
    lambda = y(find(abs(y)==norm(y,Inf),1));
end
```

Það var keyrt með eftirfarandi forriti:

```
A = [3 2 -2; -3 -1 3; 1 2 0];
x0 = [1;0;0];
veldaadferd(A,x0,5)
```

og þá fékkst:

```
x =

     1
     0
     0


x =

   1.000000000000000
  -1.000000000000000
   0.333333333333333


x =

  -0.333333333333333
   1.000000000000000
   1.000000000000000
```

```
x =

  -0.333333333333333
   1.000000000000000
   0.555555555555555


x =

  -0.066666666666667
   1.000000000000000
   1.000000000000000


x =

  -0.090909090909091
   1.000000000000000
   0.878787878787879


ans =

   2.200000000000000
```

2 Dæmi 4.2.2

Til að leysa dæmið var eftirfarandi fall skrifað:

```
function lambda = andhverfveldaadferd(A,q,x,eps)
    [L,U] = lu(A-q*eye(size(A)));
    y = U\(L\x);
    n =y(find(abs(y)==norm(y,Inf),1));
    x = y/n
    lambda = 1/n + q
    while 1
        y = U\(L\x);
        n =y(find(abs(y)==norm(y,Inf),1));
        %Finnum inf-normid med minnsta indexid.
        x = y/n
        oldlambda = lambda;
        lambda = 1/n + q
        if abs(lambda-oldlambda) <= eps
            break
            end
    end
end
```

Það var keyrt með eftirfarandi forriti:

```
A = [1 -0.4 -0.4; -0.4 1 0.4; -0.6 0.4 1];
q = 0.7;
eps = 5*10^(-5);
x = [1;1;1];
andhverfveldaadferd(A,q,x,eps);
```

og þá fékkst:

```
x =

   0.652173913043478
   1.000000000000000
```

```
   -0.304347826086956


lambda =

    0.617391304347826


x =

    0.305605786618445
    1.000000000000000
   -0.641952983725136


lambda =

    0.620976491862568


x =

    0.168185301881972
    1.000000000000000
   -0.805501149621051


lambda =

    0.610525419398791


x =

    0.096604272112621
    1.000000000000000
   -0.888076876149124


lambda =

    0.606127540695302


x =

    0.057018443508657
    1.000000000000000
   -0.933956917975276


lambda =

    0.603609855406427


x =

    0.034155497386451
    1.000000000000000
   -0.960437088423519


lambda =

    0.602162965676012
```

```
x =

    0.020639314779446
    1.000000000000000
   -0.976093240759551


lambda =

    0.601306977784401


x =

    0.012536637402039
    1.000000000000000
   -0.985478656233020


lambda =

    0.600793882545976


x =

    0.007638756058631
    1.000000000000000
   -0.991151934282220


lambda =

    0.600483723863659


x =

    0.004663218047324
    1.000000000000000
   -0.994598536725055


lambda =

    0.600295298091049


x =

    0.002850024905242
    1.000000000000000
   -0.996698780826492


lambda =

    0.600180477707306


x =

    0.001743076547512
    1.000000000000000
   -0.997980972829204


lambda =
```

```
141
142     0.600110380249313
143
144
145  x =
146
147     0.001066523657276
148     1.000000000000000
149    -0.998764632428033
150
151
152  lambda =
153
154     0.600067537565876
```