

Lab Information

1 Information about Python

It is easy to handle vector and matrix operations in Python (via numpy).

List of Python commands

Write the program using any text editor (e.g. emacs), and save in a file with extension “.py”, e.g. “PellesOwnSimplexmethodNr1.py”. (Note that Unix distinguishes between uppercase and lowercase letters.)

The file must first contain `from numpy import *`, to be able to use numpy. Observe that indices for vectors and matrices normally start from 0 (not 1) in Python.

Expected result	Python (numpy)
Scalar product of two vectors a and b .	<code>dot(a,b)</code>
Product of matrix A and vector x , i.e. Ax .	<code>dot(A,x)</code>
Transpose of matrix A , i.e. A^T .	<code>A.T</code>
Compute inverse B^{-1} .	<code>linalg.inv(B)</code>
Solve x from $Bx = b$.	<code>linalg.solve(B,b)</code>
Compute $A^T y$.	<code>dot(A.T,y)</code>
Component-wise $a * b$, a/b .	<code>a*b, a/b</code>
Find minimum of the vector x .	<code>min(x)</code>
Find index of the minimum element of x .	<code>argmin(x)</code>
Indices of particular elements in the vector x .	<code>nonzero(x>0.5)</code>
Number of rows, m , and columns, n , in A .	<code>[m,n]=shape(A)</code>
Create $m \times n$ matrix with zero elements.	<code>zeros((m,n))</code>
Create $m \times m$ identity matrix.	<code>eye(m)</code>
The norm of the difference between vectors x and y .	<code>linalg.norm(x-y)</code>
The vector (1,2,3,4,5,6,7).	<code>range(1,7)</code>
The columns in A with the indices t .	<code>A[:,t]</code>
Display 'text' on the screen.	<code>print('text')</code>
Display value of z on the screen.	<code>print('z = '+repr(z))</code>
Display values of vector x on the screen.	<code>print('x: ', '+', '.join(map(str,x)))</code>
Save time in t . (Use difference between after and before.)	<code>t=time.time()</code>
Repeat for $j = 1 \dots n$.	<code>for jin range(1,n)</code>
Extract those values in vector a that are not in vector b (the result is sorted).	<code>setdiff1d(a,b)</code>
While-clause.	<pre>while e > 0: e = e - 1</pre>
If-clause.	<pre>if i == j: a[i,j] = 2 elseif abs[i-j] == 1: a[i,j] = -1 else: a[i,j] = 0 end</pre>

In order to read file name and load data from files, see the file “lp_init.py”. It is run with the command `python lp_init.py datafilename`.