Erratalist, Programming for Computations - Python

S. Linge

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0.1 Page 102, Section 4.1.3

In the program `growth1.py`, (even if the import statement is not shown in the book) there is a missing import of the function `exp`. Thus, the code line

```
from numpy import linspace, zeros
```

should be modified to

```
from numpy import linspace, zeros, exp
```

0.2 Page 102, Section 4.1.3

The number of time points is one too many compared to the number stated in eqn. (4.8), so the text

Note that we need to compute $N_t + 1$ new values $N^1, ..., N^{N_t+1}$. A total of $N_t + 2$ values are needed in an array representation of $N^n, n = 0, ..., N_t + 1$.

should be replaced by

Note that we need to compute N_t new values $N^1, ..., N^{N_t}$. A total of $N_t + 1$ values are needed in an array representation of $N^n, n = 0, ..., N_t$.

Also, the corresponding code `growth1.py` suffers from the same error. So, the code lines

```
t = linspace(0, (N_t+1)*dt, N_t+2)
N = zeros(N_t+2)

N[0] = N_0
for n in range(N_t+1):
    N[n+1] = N[n] + r*dt*N[n]
```

should be replaced by

```
t = linspace(0, N_t*dt, N_t+1)
N = zeros(N_t+1)

N[0] = N_0
for n in range(N_t):
    N[n+1] = N[n] + r*dt*N[n]
```

Furthermore, after the code on p. 103, there is a comment in parenthesis that should now be skipped. It reads

(or to be absolutely precise, the last time point to be computed according to our set-up above is $t_{N_t+1} = 20.5$)

Finally, for the same reason, the plots in Figs. 4.4 - 4.6 show a graph that goes slightly outside the domain specified in the example, i.e. beyond t = 20. These plots should end at t = 20.

0.3 Page 114, Section 4.2.3

In the program `SIR1.py`, there is a typo in the comment of the code line

```
N_t = int(D*24/dt)   # Corresponding no of hours
```

It should be replaced by

```
N_t = int(D*24/dt)   # Corresponding no of time steps
```

0.4 Page 118, Section 4.2.6

In the program `ode_system_FE.py`, function `demo_SIR()`, there is a typo in the comment of the code line

```
N_t = int(D*24/dt)   # Corresponding no of hours
```

It should be replaced by

```
N_t = int(D*24/dt)   # Corresponding no of time steps
```

0.5 Page 36, Section 2.2

The line starting

It that case, ...

should be changed into

In that case, ...

0.6 Page 73, Section 3.4.4

In the program `test_trapezoidal.py`, the variable name `error` appears with one r too many. Thus, the code line

```
msg = 'error=%g > tol=%g' % (errror, tol)
```

should be changed into

```
msg = 'error=%g > tol=%g' % (error, tol)
```

0.7 Page 88, Exercise 3.4

The filename `integrate_sine.pdf` has wrong extension pdf. The filename should be `integrate_sine.py`.

0.8 Page 107, Section 4.1.6

In the middle of the page, the line

...so there is now ...

should be changed into

...so there is no ...

0.9 Page 188, Section 6.1.1

In the program `brute_force_root_finder_flat.py`, the `if` test is insufficient when y values are zero. The branch

```
if y[i]*y[i+1] < 0:
    ...
    ...
```

should be followed by

```
elif y[i] == 0:
    root = x[i]
    break  # Jump out of loop
```

0.10 Page 188, Section 6.1.1

In the program `brute_force_root_finder_function.py`, the `if` test in the function `brute_force_root_finder` is insufficient when y values are zero. The branch

```
if y[i]*y[i+1] < 0:
    ...
    ...
```

should be followed by

```
elif y[i] == 0:
    root = x[i]
    root.append(root)
```

0.11   Page 189, Section 6.1.2

In the program `brute_force_optimizer.py`, the loop index `i` should start at 1, not 0. Thus, the code line

```
for i in range(n-1):
```

should be changed into

```
for i in range(1, n-1):
```

0.12   Page 27, Exercise 1.3

In the third line, there is a letter a too many, i.e.

...should all be defined as a separate variables...

should be changed into

...should all be defined as separate variables ...

0.13   Page 49, Exercise 2.14

In the second line, there is a typo, i.e.

...evenly distributed from 0 and 10 ...

should be changed into

...evenly distributed between 0 and 10 ...

0.14   Page 88, Exercise 3.4

In task a), there is an s too many, so the line

... two numerical methods approximates ...

should be changed into

... two numerical methods approximate ...

0.15   Page 91, Exercise 3.11

In task a), in the interval given for x, the left bracket is wrong, i.e.

...] ...

should be changed into

... [...

0.16   Page 164, Section 5.1.1

In the beginning of the paragraph, there is a typo, i.e.

... call a cell ...

should be changed into

... called a cell ...

1   Acknowledgements