

Aims

In this computing tutorial you will work through a Python program, writing down the output that the program would produce. This will probably not take all of the class time. Use this opportunity to ask your tutor any questions that you may have about any component of the course.

You should also check the online marks recording system, www.maths.uq.edu.au/marks, to ensure that all of your marks have been recorded.

1. The following Python code applies two steps of Euler's method to the pair of DEs given in Part (b) of Question 1 of the tutorial sheet for this week.

- (a) By hand, find all of the output produced by the program.

```
step = 0.5
maxStep = 2
t = zeros(maxStep+1)
C = zeros(maxStep+1)
R = zeros(maxStep+1)
C[0] = 300
R[0] = 40
i = 0

while i < maxStep:
    CDash = 60 - 0.5 * C[i] + 0.1 * R[i]
    RDash = 0.3 * C[i] - 0.15 * R[i]
    C[i+1] = C[i] + step * CDash
    R[i+1] = R[i] + step * RDash
    t[i+1] = i * step
    i = i+1
    print "T=",t[i],": C' =",CDash," and R' =",RDash
    print "          C =",C[i],"and R =",R[i]
```

- (b) Compare your answer at time $t = 0.5$ with the answer you obtained in Question 1 of the tutorial sheet this week.
- (c) Show how to modify the program so that it uses a step size of 0.2 months, and applies Euler's method until $t = 12$ months.

The end