Homework 8
Due: 3/15/2018

- Assignments are due at the beginning of class on the due date.
- Any Matlab/R files are to be submitted as .m or .R files via Moodle (with a corresponding run/driver file if necessary).
- Each file must be uploaded individually. Zipped files will not be graded.
- Show all work and provide discussion where needed in order to receive full credit.

A detective is called to the scene of a crime where a dead body has just been found. She arrives on the scene at $10:23$ pm and begins her investigation. Immediately, the temperature of the body is taken and is found to be 80° F. The detective checks the programmable thermostat and finds that the room has been kept at a constant 68° F for the past 3 days. After evidence from the crime scene is collected, the detective continues to take the temperature of the body until enough data is collected to determine the proportionality constant for Newton's Law of Cooling to be $k \approx 0.13353$. Medical records indicate that the victim's normal body temperature was 98.6° F prior to death. There is no evidence to suggest the victim was ill at the time of death.

1. Using Newton's Law of Cooling, run simulations with both Euler's Method and the RK4 Method to find the temperature of the victim's body t hours after the time of death. Generate a plot that represents the cooling of the victim's body for each method.
2. What time did the victim die?