

## Module 4 Final Project

### Due 24<sup>th</sup> November 2008

Use the techniques that you have seen in the lectures to answer the question asked by a direct calculation and by solving a differential model.

Prepare a poster display of the problem and your group's solution. Presentation of the posters will be during lecture time on 24<sup>th</sup> November in the MSC.

The poster should show the viewer, at least:

- A description of the physical context of the problem.
- The data, and the selected interpolation function that fits the data.
- An approximation of the solution using only the data given
- One, or more, improved approximation of the solution using the interpolation function.
- The best possible approximation (that Mathematica will allow) using the interpolation function.
- Derivation of a differential model of the quantities.
- The solution of the differential model.

The quality of the posters should be sufficient to be displayed at URCAS

At least one member of the group must stay with the poster during the presentation to answer any questions about the group's work. Other members of the group will view and evaluate the other posters on display. At the end of the presentation the posters should be handed to your professor, and by 5:00pm on Monday 24<sup>th</sup> November, the Mathematica notebook(s) that your group used to solve the problem must be placed attached to the assignment within Moodle.

# Module 4 Project for Group S2G1

## Due 24<sup>th</sup> November 2008

### 1 Research Paper

**Authors** Akira Watanabe, Masahiro Kasuya, Ayumi Tsunekawa, Mieko Maeda, Atsuko Sugimoto, Makoto Kimura

**Year** 2008

**Title** Spatial and seasonal variations in CH<sub>4</sub> in groundwater used for agriculture in central Japan.

**Journal** Agriculture, Ecosystems and Environment, 127 (2008) 207–214

**Web-site** [www.elsevier.com/locate/agee](http://www.elsevier.com/locate/agee)

### 2 Data

Month (0=January)	Methane production rate (nmol L <sup>-1</sup> day <sup>-1</sup> )
0	3.08
7	4.61
10	-1.65
15	1.31

### 3 Interpolation Function

Use the most appropriate of the interpolation functions that you fitted to this data in your Module 3 project.

### 4 Question

Find an estimate for the total amount of Methane produced in the 24 months following the start of this study by 1000L of ground water in this location.