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| **UNIT ASSESSMENT FEEDBACK SHEET** |
| **UNIT NUMBER****AND TITLE** | **ME20021**Modelling Techniques 2 | **UNIT CONVENOR(S)**Dr D N JohnstonDr D A S Rees |
| **DATE** | **19th May 2016** |
| **QUESTION 1** | Almost all students attempted this question.1. Mainly fine. The commonest large error was not grouping u(n+1, i) terms to the LHS. Some didn’t define *p*.
2. Mainly ok. Some assumed  at the boundary. Some put the code in the wrong place.
3. Most got the correct quadratic in *k*: $k^{2}+8pk-1=0$, and the correct solution: $k=-4p\pm \sqrt{16p^{2}+1}$. Some then said that $\sqrt{16p^{2}+1}=4p+1$. This is basic GCSE-level algebra!Some didn’t state the criteria for stability.Very few showed explicitly that one root has a magnitude greater than one. It is simple to show that $-4p-\sqrt{16p^{2}+1}$ is greater than 1 in magnitude, as both terms are negative and the second term has a magnitude greater than 1.
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| **QUESTION 2** | About 2/3 of students attempted this question.1. Good. Almost all rearranged the equation correctly and described the method. Could also say that it is suitable for parallel processing/matrix algebra.
2. Good. Note that over-relaxation cannot be applied directly to Jacobi as it will be unstable; apply it to Gauss Seidel instead.
3. Generally good. Most showed the results neatly, using tables, but often the working or the use of Neumann boundaries weren’t shown clearly. Credit was given for right method but wrong numbers.
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| **QUESTION 3** | Almost all students attempted this question. In part (a) the chief issue was the omission of the *A0*term in the series which often appeared magically in part (b) with no explanation! A few attempted the separation of variables using the very slow method described (and warned against!) in section 3 of the online notes; this took about 3 pages rather than less than half a page to do.Only a sizeable minority managed part (c) even though it is in the online notes. In part (d) I was treated to a large number of highly amusing but incorrect descriptions of the significance of ½*A0.* These will be posted elsewhere for your delight.Generally the integration by parts went well. Some couldn’t bring themselves to believe that the summation should be over even values of *n*.  |
| **QUESTION 4** | Probably about half the class attempted this question. The bookwork in part (a) went well, and most negotiated part (b) successfully. The manner in part (c) may be answered becomes quite clear if a diagram of the step-function solution is sketched. Some of the answers in part (d) seemed to be a repetition of the “what is the physical meaning of the solution?” for a different problem on problem sheet 5 queston 1, which is completely different from that of the exam question! |