

M412 Assignment 4, due Friday October 7

1. [10 pts] Haberman Problem 1.4.1, Parts (f) and (g).
2. [10 pts] Haberman Problem 1.4.5.
3. [10 pts] Haberman Problem 1.4.7, Parts (a) and (c).
4. [10 pts] Haberman Problem 1.4.10.
5. [10 pts] Haberman Problem 1.4.12. (See Haberman's equation (1.2.11) for precisely what he means by a conservation law.)
6. [10 pts] For the PDE

$$\begin{aligned}u_t &= u_{xx} + \gamma x - 1 \\u_x(t, 0) &= 0 \\u_x(t, 1) &= 0 \\u(0, x) &= x^2,\end{aligned}$$

determine the value of γ for which an equilibrium solution exists, and find the equilibrium solution.

7. [10 pts] Solve the PDE in Problem 6 for all time.