

PDEs: UNASSESSED HOMEWORK II

Please hand (the solutions of) it in at the end of our second lecture on Tuesday 19/3/2013

For each of the following second order linear partial differential equations:

- Classify the equation as hyperbolic, parabolic or elliptic;
- Reduce it to canonical form;
- Solve (when possible) the canonical equation;
- Find (when possible) the general solution.

a) $u_{xx} - 4u_{xy} + 4u_{yy} + u_x + u_y = 6x - y;$

b) $u_{xx} + 2u_{xy} + 4u_{yy} = 0;$

c) $x^2u_{xx} + 2xyu_{xy} + y^2u_{yy} = 0;$

d) $x^2u_{xx} - y^2u_{yy} = xy^3; \quad x > 0, \quad y > 0.$