Assignment-8

1. Classify the partial differential equations $(\mathbf{i})8u_{xx} - 2u_{xy} - 3u_{yy} = 0, (\mathbf{ii})u_{xx} + 2u_{xy} + 5u_{yy} = 0$ and $(\mathbf{iii})4u_{xx} - 12u_{xy} + 9u_{yy} = 0$.
2. Classify the partial differential equations $(\mathbf{i})\ u_{xx} + (x-1)u_{xy} + u_{yy} - 2x^2u_x + 3xyu_y + 2u = \sin x$, $(\mathbf{ii})\ u_{xx} + 2x\,u_{xy} + (1-y^2)u_{yy} = 0$ and $(\mathbf{iii})\ (1+y^2)u_{xx} + (1+x^2)u_{yy} = 0$ graphically in the plane.
3. Reduce the partial different equation $2u_{xx} - 2u_{xy} + 5u_{yy} = 0$ into a normal form.
4. Reduce the partial different equation $u_{xx} - 2u_{xy} = 0$ into a normal form.
5. Reduce the partial different equation $u_{xx} + (2x+3)u_{xy} + 6xu_{yy} = 0$ into a normal form.
6. Reduce the partial different equation $(\sin^2 x)\,u_{xx} + (\sin 2x)u_{xy} + (\cos^2 x)\,u_{yy} = 0$ into a normal form.
7. Reduce the partial different equation $u_{xx} - 2\,(\sin x)u_{xy} + (\cos^2 x)\,u_{yy} - (\cos x)\,u_y = 0$ into a normal form and then find its general solution.