

SRM Institute of Science and Technology
Department of Mathematics
21MAB206T- Numerical Methods and Analysis
Unit V: - Numerical Solution of Partial Differential Equations
Tutorial Sheet – II

1. Solve the poisson's equation $u_{xx} + u_{yy} = -x^2y^2$, over the square region bounded by the lines $x=0, y=3$ given that $u=10$ throughout the boundaries taking $h=1$
2. Solve the poisson's equation $\nabla^2 u = -(x+y)^2$, over the square region bounded by the lines $x=0, y=0, x=3, y=3$ given that $u=0$ throughout the boundaries taking $h=1$
3. Using Schmid's process solve $u_{xx} = 2u_t$, with the conditions $u(x,0) = \frac{1}{4}x(15-x)$ for $0 \leq x \leq 12; u(0,t) = 0; u(12,t) = 9$ for $0 < t < 12$ take $h=3=k$.
4. Using Schmidt's process solve $u_{xx} = u_t$ in $0 < x < 1$ and $t > 0$ subject to the conditions $u(x,0) = 0 = u(0,t)$ and $u(1,t) = t$ by taking $h=1/4$ and $k=1/8$. Evaluate u for all intermediate points for x and 2 increments for t .
5. Solve the Parabolic partial differential equation $5u_{xx} = u_t$ with $u(0,t)=0$, $u(5,t)=60$ and $u(x,0) = \begin{cases} 20x, 0 \leq x \leq 3 \\ 60, 3 \leq x \leq 5 \end{cases}$ for 5 times taking $h=1$ by Schmidt Method