PDE Solving Resources

* <https://www.mathworks.com/matlabcentral/fileexchange/38087-burgers-equation-in-1d-and-2d>

| % Set up the problem parameters  nu = 0.1;  L = 2\*pi;  tlist = linspace(0,1,101);  xlist = linspace(0,L,101);  % Define the initial condition  u0 = sin(xlist);  % Define the PDE  pdefun = @(x,t,u,u\_x) nu\*diff(u,2) + u\*diff(u);  % Solve the PDE using the PDE Toolbox  sol = pdepe(0,pdefun,@(x) u0,0,xlist,tlist);  % Plot the solution  [X,T] = meshgrid(xlist,tlist);  surf(X,T,sol(:,:,1));  xlabel('x'); ylabel('t'); zlabel('u'); |
| --- |

LQR PINN Implementation:

Paper1:

* Github: <https://github.com/Tenavi/QRnet>
* Paper: <https://arxiv.org/pdf/2009.05686.pdf>

Paper2:

* Github:

**Meet (Teams) on 30th March**:

Things to discuss:

1. OCP using PMP Principle

* Implementation is almost done!
* But data of (t, x, lambda) is missing
* No issue in training it; but for performance testing, it is required

1. Regarding the 1D Burgers equation, I wanted to simulate the data for v=0.1 and therefore have explored some methods in MATLAB

But the results showed are for different initial and boundary conditions. Therefore, I didn't go ahead with this

1. Read a paper on QRNet:

* They provide a method for generating (t, x, Value Function) at various points
* Obtaining optimal control by solving the HJB equation

**What are the expectations or Objectives for this semester?**

**LOR For KC Mahindra Scholarship**