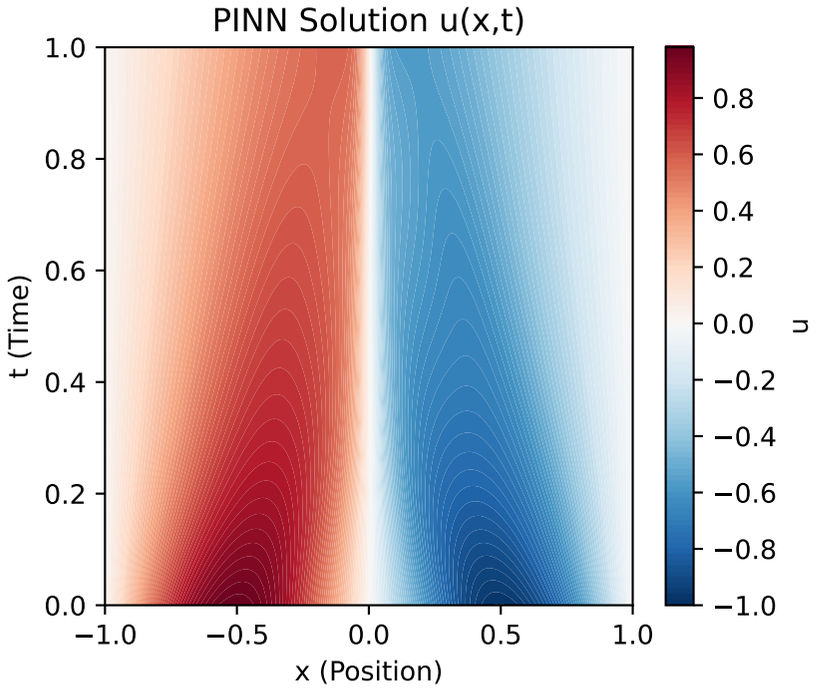
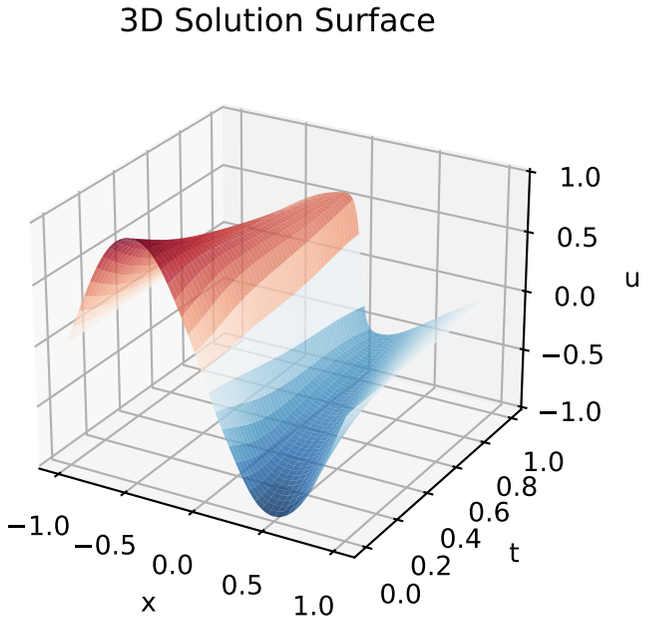
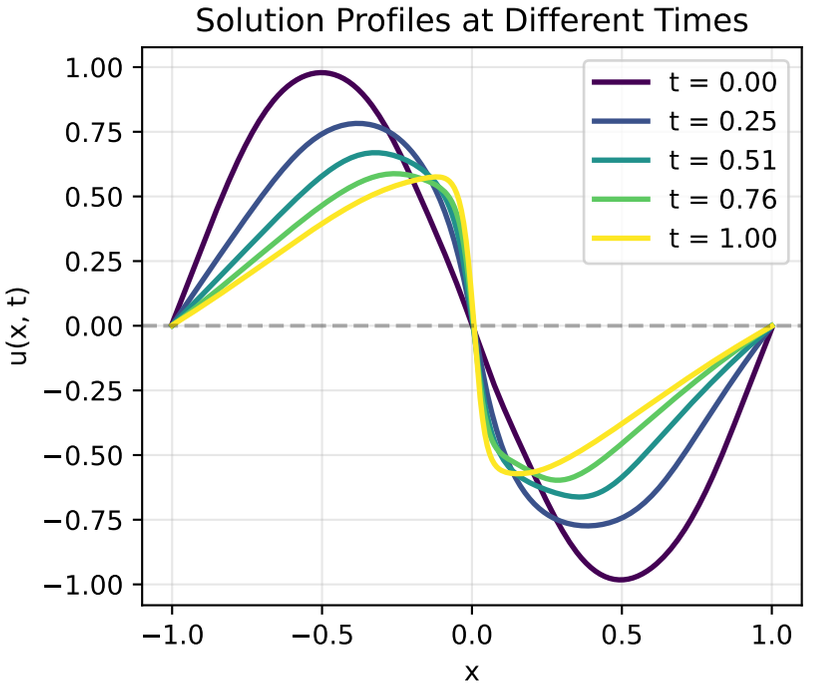
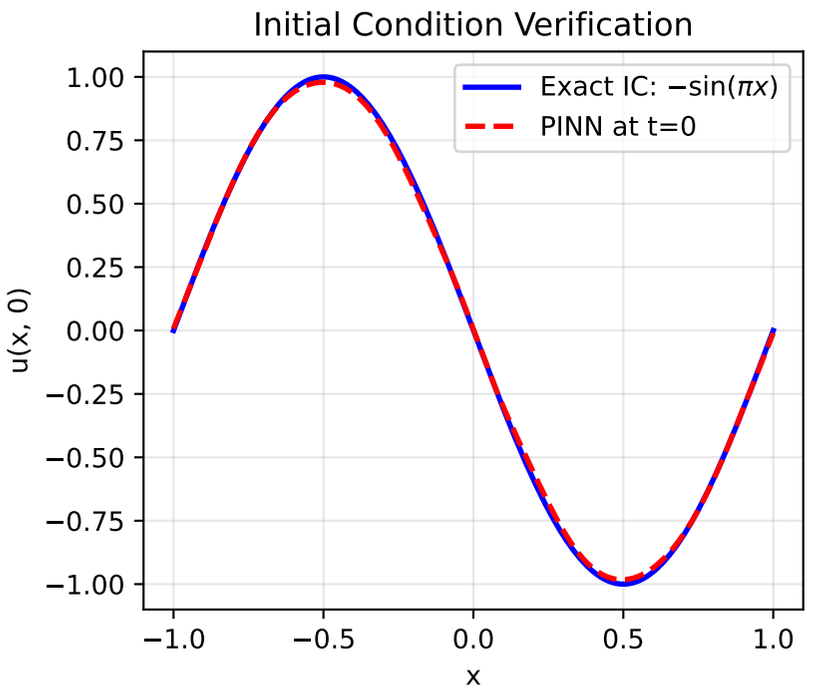
PINN Solution: Non-Linear Burgers Equation

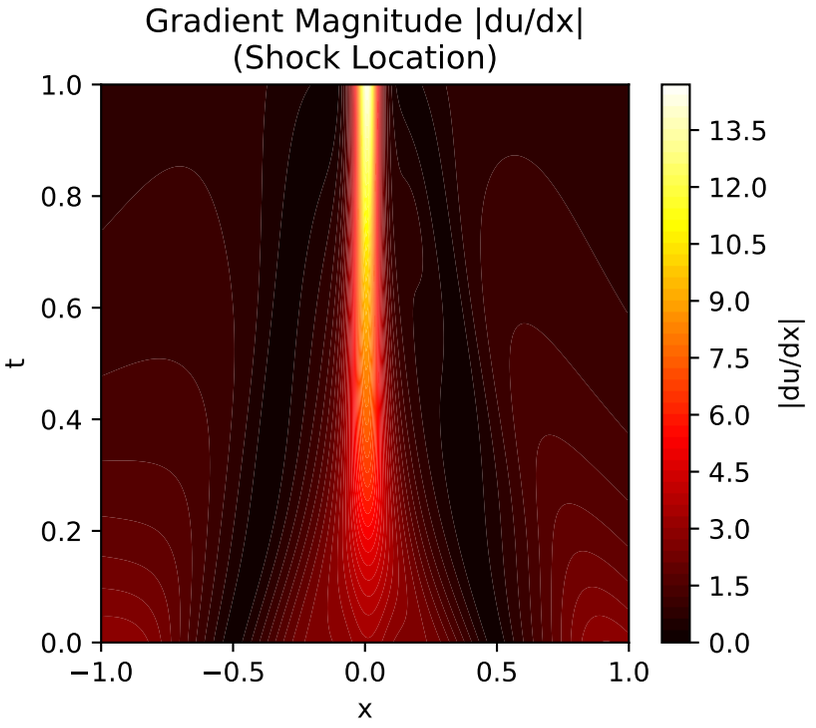
$$\frac{\partial u}{\partial t} + u\frac{\partial u}{\partial x} = \nu\frac{\partial^2 u}{\partial x^2}$$

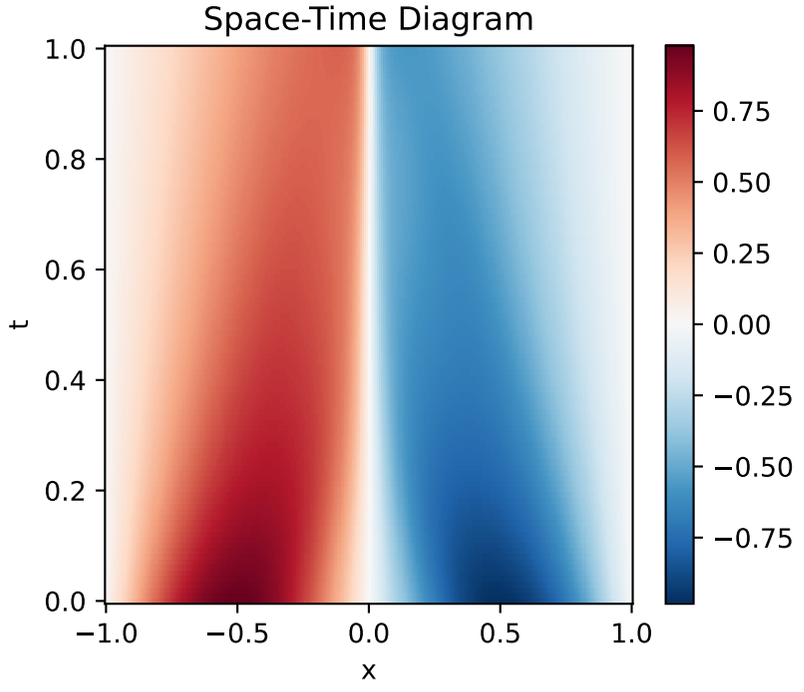


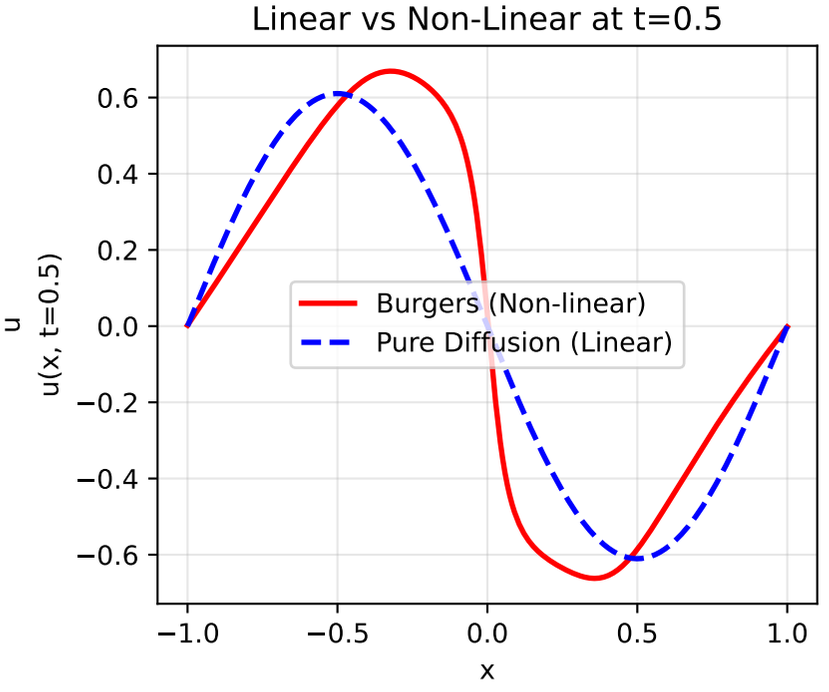










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Burgers Equation PINN Results
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PDE: du/dt + u*du/dx = nu*d²u/dx²

Parameters:
- Viscosity: nu = 0.003183
- Domain: x in [-1, 1], t in [0, 1]
- Epochs: 10000

Initial Condition:
u(x, 0) = -sin(pi*x)

Boundary Conditions:
u(-1, t) = u(1, t) = 0

Results:
- Final Loss: 0.205778
- Solution Range: [-0.983, 0.979]

Key Observations:
1. Shock forms near x=0
2. Wave steepens due to non-linear
   convection term (u * du/dx)
3. Viscosity prevents discontinuity
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