**Solve Hyperbolic PDE Function Documentation**

**Description**

The **solveHyperbolicPDE** function numerically solves the one-dimensional hyperbolic partial differential equation (PDE), commonly known as the wave equation, using a finite difference method. It discretizes both the spatial and temporal domains and iteratively computes the solution over time.

**Input Arguments**

* **L**: Length of the spatial domain (1D) over which the PDE is solved.
* **T**: Total time for which the solution is computed.
* **Nx**: Number of spatial grid points (nodes) excluding the boundaries.
* **Nt**: Number of time steps.
* **c**: Wave speed coefficient.
* **u0**: Initial condition function handle.
* **du0\_dt**: Function handle representing the time derivative of the initial condition.

**Output Argument**

* **u**: Matrix representing the computed solution of the PDE. Each column corresponds to a time step, and each row corresponds to a spatial grid point.

**Method Explanation**

1. **Initialization**: Initialize parameters such as spatial and temporal discretization steps, spatial grid points, and construct the grid in the spatial domain.
2. **Construct Coefficient Matrix**: Call the **constructHyperbolicMatrix** function to construct the coefficient matrix 𝐴*A* representing the discretized form of the hyperbolic PDE.
3. **Initial Conditions**: Compute the initial condition 𝑢0(𝑥)*u*0​(*x*) and its time derivative ∂𝑢∂𝑡∂*t*∂*u*​ at 𝑡=0*t*=0 using the provided function handles.
4. **Time Stepping**: Update the solution iteratively over time using the finite difference method for hyperbolic PDEs. At each time step, the solution is computed based on the previous two-time steps.
5. **Visualization**: Visualize the computed solution using a surface plot, where the x-axis represents spatial coordinates, the y-axis represents time, and the z-axis represents the solution value 𝑢*u*.