Solving the 1D wave equation: **d²u/dt² = c² d²u/dx²**

Epoch 0, Loss: total=0.47782623767852783, pde=0.0006180537166073918, ic=0.4576023817062378, bc_left=0.01054425723850727, bc_right=0.009061530232429504

Epoch 500, Loss: total=0.033942997455596924, pde=0.0011350361164659262, ic=0.0037341781426221132, bc_left=0.014295672997832298, bc_right=0.014778110198676586

Epoch 1000, Loss: total=0.01773785799741745, pde=0.0012899799039587379, ic=0.0011983171571046114, bc_left=0.007349343970417976, bc_right=0.007900216616690159

Epoch 1500, Loss: total=0.006364312954246998, pde=0.0010323283495381474, ic=0.00023994751973077655, bc_left=0.0025793295353651047, bc_right=0.00251270760782063

Epoch 2000, Loss: total=0.002885933965444565, pde=0.0004554945044219494, ic=8.443077240372077e-05, bc_left=0.0010896411258727312, bc_right=0.0012563675409182906

Epoch 2500, Loss: total=0.004813327919691801, pde=0.0030966189224272966, ic=0.00014693163393530995, bc_left=0.0006229395512491465, bc_right=0.0009468378266319633

Epoch 3000, Loss: total=0.0010830762330442667, pde=0.00017646771448198706, ic=9.728832810651511e-05, bc_left=0.000252243885323405, bc_right=0.0005570958601310849

Epoch 3500, Loss: total=0.001194637967273593, pde=0.0001992617326322943, ic=0.000123755686217919, bc_left=0.00019408491789363325, bc_right=0.000677535601425916

Epoch 4000, Loss: total=0.0016756248660385609, pde=0.0002138528216164559, ic=0.00039940199349075556, bc_left=0.0004369934322312474, bc_right=0.0006253765313886106

Epoch 4500, Loss: total=0.0009944809135049582, pde=0.0003264551633037627, ic=0.00014312072016764432, bc_left=0.0001297546550631523, bc_right=0.00039515033131465316

Epoch 5000, Loss: total=0.020961537957191467, pde=0.02024078741669655, ic=0.00016613624757155776, bc_left=0.00019621063256636262, bc_right=0.0003584026417229246

Epoch 5500, Loss: total=0.0006640502833761275, pde=0.00011770043056458235, ic=7.34275090508163e-05, bc_left=0.00013605234562419355, bc_right=0.0003368699981365353

Epoch 6000, Loss: total=0.0019805431365966797, pde=0.0014385037356987596, ic=7.908824045443907e-05, bc_left=0.00016444661014247686, bc_right=0.0002985045721288770

Epoch 6500, Loss: total=0.00040618362254463136, pde=5.992412843625061e-05, ic=4.40301992057357e-05, bc_left=9.343739657197148e-05, bc_right=0.00020879189833067358

Epoch 7000, Loss: total=0.0005041590193286538, pde=0.00017349688278045505, ic=4.00816643377766e-05, bc_left=7.979306246852502e-05, bc_right=0.00021078743156976998
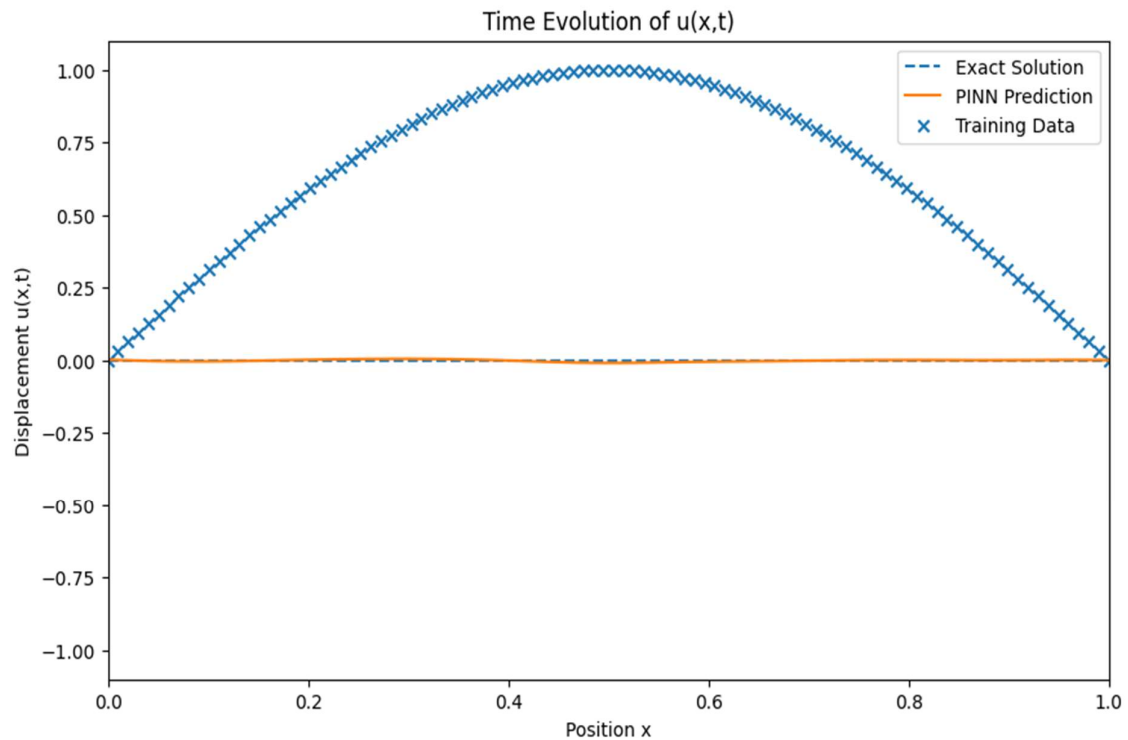
Epoch 7500, Loss: total=0.0007293677190318704, pde=0.00042623968329280615,
ic=3.7656576751032844e-05, bc_left=6.926942296558991e-05,
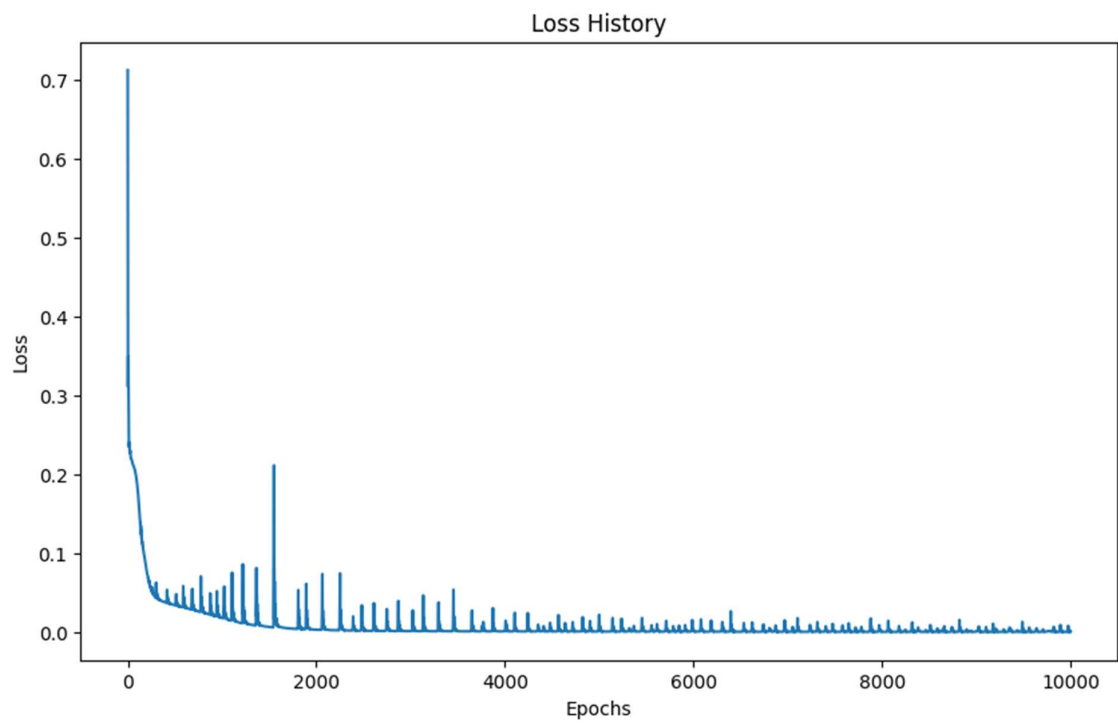bc_right=0.0001920198872871697

Epoch 8000, Loss: total=0.00041888351552188396, pde=0.00010729266068665311,
ic=3.9586691855220124e-05, bc_left=8.575386164011434e-05,
bc_right=0.0001862502977019176

Epoch 8500, Loss: total=0.0005250441608950496, pde=0.00035655463580042124,
ic=1.4324367839435581e-05, bc_left=3.831069989246316e-05,
bc_right=0.0001158544619102031

Epoch 9000, Loss: total=0.0010099158389493823, pde=0.0008360096253454685,
ic=2.8795831894967705e-05, bc_left=3.7356410757638514e-05,
bc_right=0.00010775392729556188

Epoch 9500, Loss: total=0.0028111652936786413, pde=0.0025822597090154886,
ic=8.46715847728774e-05, bc_left=4.9612961447564885e-05,
bc_right=9.462094021728262e-05

Time Evolution of u(x,t)

Loss History

PINN Solution of 1D Wave Equation