

Figure 3: American Put FDM Solution in 3D

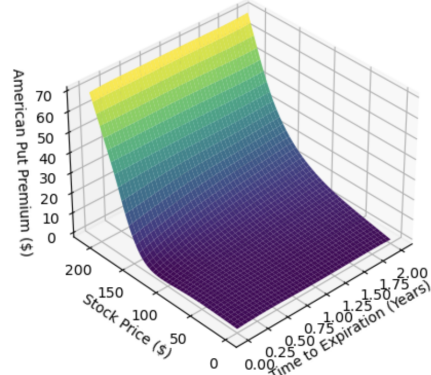


Figure 4: American Put PINN Solution in 3D

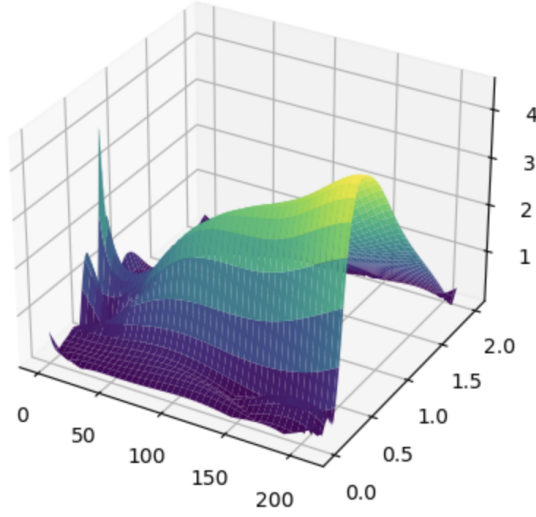


Figure 5: Absolute difference between FDM and PINN solutions

The computation time of the FDM is approximately 6.9506 seconds, whereas the PINN takes approximately 26.0606 seconds to run. Figure 2 clearly shows the inability of our PINN to model the corner shown in Figure 1. However, the slope of the function approximation is nearly identical to the FDM solution as seen in Figures 3 and 4. The PINN's performance suffers the most at intermediate times to expiration, as seen in Figure 5.

We also compared solutions of an American Call with strike price \$24, 0.4 years to expiration, underlying stock volatility of 38%, underlying stock spot price of \$23, risk-free interest rate of 2%, and dividend yield of 0.5%