

Solving First Order ODE using Artificial Neural Networks

$dy/dx + A(x) * y = B(x)$, where: $A(x) = 1/5$

$$B(x) = \exp(-x/5) * \cos(x)$$

We write the ODE as: $dy/dx = f(x,y) = B(x) - A(x) * y$

Results:

The minimized cost function is: 0.0089

Optimized weights for input layer mapping to hidden layer (Theta1): $[-0.27885045 \ 0.01432133 - 0.20874863 \ 1.12551193 \ 1.68346008 - 0.21805959$

$0.93272666 - 0.28261017 - 0.61747631 - 1.51712996]$

Optimized weights for hidden layer mapping to output (Theta2): $[[\ 1.33405946 - 1.88073088 - 0.29983003 - 0.54518663 \ 0.2388933 \ 2.48332204$

$0.07947255 - 0.42812636 \ 1.16035749 - 0.04217991]]$

Plot showing results:

