List of Tables

1.1 Index computation for Haar basis functions......................................................42
1.2 Comparison of algorithmic complexity of
    the proposed method with FFT and WT..........................................................47
2.1 Haar values of \((U)\) and observed \((U_0)\)
    soil temperature \((0°C)\) at depths.................................................................60
2.2 Haar values of \((U)\) and observed \((U_0)\)
    soil temperature \((0°C)\) at depths.................................................................61
3.1 Comparison of the analytical and Haar solutions
    of Fisher’s equation at \(t = 0.25\)...................................................................79
3.2 Comparison of the analytical and Haar solutions
    of Fisher’s equation at \(t = 0.48\)...................................................................79
4.1 Comparison of the analytical and Haar solutions of
    FitzHugh-Nagumo equation at \(t = 0.48\).........................................................96
4.2 Comparison of the analytical and Haar solutions of
    Cahn-Allen equation at \(t = 0.85\).................................................................96
5.1 Errors between the exact, Haar and the numerical
    solutions with \(\alpha = 0.1\) and \(\beta = 1\).......................................................115
5.2 Error estimation of Convection-Diffusion equation
    for various values of spatial variable \(x\) and time \(t\)......................................115
5.3 Error estimation of Convection-Diffusion equation for various values of spatial variable $x$ and time $t$.................................................................116

5.4 Comparison of the exact solution and the Haar solution of Convection-Diffusion equation for $t = 0.85$ .................................................................116

5.5 Comparison of the exact solution and the Haar solution of Convection-Diffusion equation for $t = 0.25$ .................................................................117

5.6 Comparison of the exact solution and the Haar solution of Convection-Diffusion equation for $t = 0.48$ .................................................................117

7.1 The absolute errors at different times and space locations for example.1.........................................................................................................................158

8.1 Comparison between numerical and Haar solutions of substrate $s(x, t)$ for $k = 0.01, \alpha = 0.001, t = 1, m = 16$ and $m = 32$ .................................170

8.2 Comparison between numerical and Haar solutions of substrate $s(x, t)$ for $k = 0.01, \alpha = 1.0, t = 3, m = 16$ and $m = 32$ .................................170

9.1 Comparison of the exact solution and the Haar solution of Burgers' equation with $v = 1, \Delta t = 0.000001, h = 0.0125$ and $m = 16$ ........................................185

9.2 Comparison of results at different positions and times for $v = 1, \Delta x = 0.0125(N = 80), \Delta t = 1.0E−05$ and $m = 16$ ...........................................185

9.3 Comparison of results at different positions and times for $v = 1, \Delta x = 0.0125(N = 80), \Delta t = 1.0E−05$ and $m = 16$ ...........................................187

9.4 Comparison of the exact solution and the Haar solution of Burgers' equation for $t = 0.85$ ..........................................................................................187

9.5 Some comparison results of the Haar solution.................................................................................................................................189

10.1 Values of Inductance (I) and Capacitance (C).................................................................................................................................198