

# Contents

<b>Preface</b>	<b>ix</b>
<b>Acknowledgments</b>	<b>xiii</b>
<b>A Note on the MATLAB Programs</b>	<b>x v</b>
<b>1 Differentiation Matrices</b>	<b>1</b>
<b>2 Unbounded Grids: The Semidiscrete Fourier Transform</b>	<b>9</b>
<b>3 Periodic Grids: The DFT and FFT</b>	<b>17</b>
<b>4 Smoothness and Spectral Accuracy</b>	<b>29</b>
<b>5 Polynomial Interpolation and Clustered Grids</b>	<b>41</b>
<b>6 Chebyshev Differentiation Matrices</b>	<b>51</b>
<b>7 Boundary Value Problems</b>	<b>61</b>
<b>8 Chebyshev Series and the FFT</b>	<b>75</b>
<b>9 Eigenvalues and Pseudospectra</b>	<b>87</b>
<b>10 Time-Stepping and Stability Regions</b>	<b>101</b>
<b>11 Polar Coordinates</b>	<b>115</b>
<b>12 Integrals and Quadrature Formulas</b>	<b>125</b>
<b>13 More about Boundary Conditions</b>	<b>135</b>
<b>14 Fourth-Order Problems</b>	<b>145</b>
<b>Afterword</b>	<b>153</b>
<b>Bibliography</b>	<b>155</b>
<b>Index</b>	<b>161</b>