Course # Math 605
Title Asymptotic Expansions and Perturbation Methods


<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Sec.</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sept. 25-29</td>
<td>3.4-3.8</td>
<td>Idea of asymptotic expansion around an irregular singular point. Meaning of little o and big O. Asymptotic relations and functions. Examples. Asymptotic series.</td>
</tr>
<tr>
<td>2</td>
<td>Oct. 2-6</td>
<td>3.7-3.8</td>
<td>Asymptotic solutions of linear differential equations</td>
</tr>
<tr>
<td>3</td>
<td>Oct. 9-13</td>
<td>4.1  4.2 4.3</td>
<td>Singularities Nonlinear differential equations NLDE Contd.</td>
</tr>
<tr>
<td>4</td>
<td>Oct. 16-20</td>
<td>6.1-6.3 6.4</td>
<td>Asymptotic approximation of integrals. Laplace method and Watson’s Lemma</td>
</tr>
<tr>
<td>5</td>
<td>Oct. 23 – 27</td>
<td>6.5</td>
<td>Method of Stationary phase</td>
</tr>
<tr>
<td>6</td>
<td>Oct. 30-Nov.03</td>
<td>6.6</td>
<td>Method of Steepest Descent Applications</td>
</tr>
<tr>
<td>7</td>
<td>Nov. 11</td>
<td>7.1</td>
<td>Perturbation theory</td>
</tr>
</tbody>
</table>

Eid Al-Adha  Break November 11 – November 21, 2010

<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Sec.</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Nov. 22-24</td>
<td>7.2</td>
<td>Regular and singular perturbation</td>
</tr>
<tr>
<td>9</td>
<td>Nov.27-Dec 01</td>
<td>7.3</td>
<td>Perturbation of eigenvalue problems</td>
</tr>
<tr>
<td>10</td>
<td>Dec. 4 - 8</td>
<td>7.4</td>
<td>Asymptotic matching</td>
</tr>
<tr>
<td>11</td>
<td>Dec. 11-15</td>
<td>9.1-9.2</td>
<td>Boundary layers</td>
</tr>
<tr>
<td>12</td>
<td>Dec.18 - 22</td>
<td>9.3-9.4</td>
<td>Boundary layer approximations</td>
</tr>
<tr>
<td>13</td>
<td>Dec.25-29</td>
<td>10.1-10.2</td>
<td>WKB methods</td>
</tr>
<tr>
<td>14</td>
<td>Jan.1-5</td>
<td>10.3-10.4</td>
<td>Matching and turning points</td>
</tr>
<tr>
<td>15</td>
<td>Jan.8-12</td>
<td>10.5</td>
<td>Turning point problems</td>
</tr>
</tbody>
</table>

Office: 5-430
Phone: 2189
Office Hours: SUMTW: 10:00 – 11:00 A.M.
Email: fzaman@kfupm.edu.sa
webpage http://faculty.kfupm.edu.sa/math/fzaman/