

MP469: Mathematical Methods —Part II

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Material accompanying this course is available on the web at www.thphys.may.ie/thphys/staff/bdolan/teaching.html

Textbooks:

1. Kreider, Kuller Ostberg and Perkins, *An Introduction to Linear Analysis*
2. Arfken, *Mathematical Methods for Physicists*
3. Morse and Feshbach, *Methods of Mathematical Physics (2 vols.)*
4. Courant and Hilbert, *Methods of Mathematical Physics, Vol. 1*

Topics:

1. Linear independence of functions
2. Orthogonal function expansions and Sturm-Liouville theory
 - Self-adjointness
 - Orthogonality
 - Linear independence
 - Completeness
 - Applications to inhomogeneous differential equations
3. Partial differential equations and separation of variables
 - Wave Equation
 - Heat equation
 - Laplace's equation
4. Complex analysis in one variable
 - Differentiation and Integration
 - Analyticity and Laurent expansions
 - Laplace's equation
 - Calculus of Residues
 - Fourier Transforms