

Contents

| | <i>Units</i> |
|----------------------------------------------------------|--------------|
| Introduction | |
| 1 Numerical Methods | |
| 1.1 Fourier Transforms of Bessel Functions | 6 |
| 1.6 Multigrid Methods | 10 |
| 2 Waves | |
| 2.2 Dispersion | 7 |
| 2.11 Fisher's Equation for Population Dispersal Problems | 9 |
| 3 Fluid and Solid Mechanics | |
| 3.6 Particle Drift in a Periodic Flow Field | 4 |
| 3.9 Viscous Flow in a Collapsible Channel | 9 |
| 3.10 Smoke Rings | 8 |
| 4 Dynamics | |
| 4.5 Euler's Equations | 8 |
| 5 Quantum Mechanics | |
| 5.2 S-Wave Scattering | 7 |
| 5.3 Bound State Energies for One-Dimensional Potentials | 9 |
| 7 Mathematical Methods | |
| 7.3 Minimisation Methods | 8 |
| 7.4 Airy Functions and Stokes' Phenomenon | 9 |
| 9 Operational Research | |
| 9.1 Policy Improvement for a Markov Decision Process | 4 |
| 9.4 Option Pricing in Mathematical Finance | 6 |
| 10 Statistics | |
| 10.9 Markov Chain Monte Carlo | 6 |
| 10.16 The Tennis Modelling Challenge | 8 |
| 11 Statistical Physics | |
| 11.3 Classical gases with a microscopic thermometer | 8 |

| | | |
|-----------|-----------------------------------------------------|----|
| 12 | Nonlinear Dynamics & Dynamical Systems | |
| 12.3 | The Lorenz Equations | 10 |
| 12.6 | Chaos and Shadowing | 10 |
| 13 | Logic and Computation | |
| 13.1 | Minimisation of Deterministic Finite-State Automata | 10 |
| 14 | General Relativity | |
| 14.5 | Cosmological Distances | 8 |
| 14.6 | Isolating Integrals for Geodesic Motion | 8 |
| 15 | Number Theory | |
| 15.1 | Primality Tests | 9 |
| 15.10 | The Continued Fraction Method for Factorisation | 8 |
| 16 | Algebra | |
| 16.1 | The Galois Group of a Polynomial | 7 |
| 16.5 | Permutation Groups | 7 |
| 17 | Combinatorics | |
| 17.1 | Graph Colouring | 7 |
| 17.3 | Hamiltonian Cycles | 5 |
| 19 | Communication Theory | |
| 19.1 | Random Codes | 5 |
| 20 | Probability | |
| 20.5 | Percolation and the Invasion Process | 9 |
| 20.6 | Loss Networks | 9 |
| 23 | Astrophysics | |
| 23.5 | Ionization of the Interstellar Gas near a Star | 8 |
| 23.6 | Accretion Discs | 8 |

You may choose freely from the projects above, independently of whether you are studying the examinable courses with which your chosen projects are connected. For up-to-date information on the maximum credit for the Computational Projects in Part II of the Mathematical Tripos, and the total number of units required to achieve that maximum, please consult both the Undergraduate Schedules of the Mathematical Tripos and § 2.1 of the Introduction. Please also see § 2.1 of the Introduction for more information on how credit is awarded.