

II CATAM Introduction

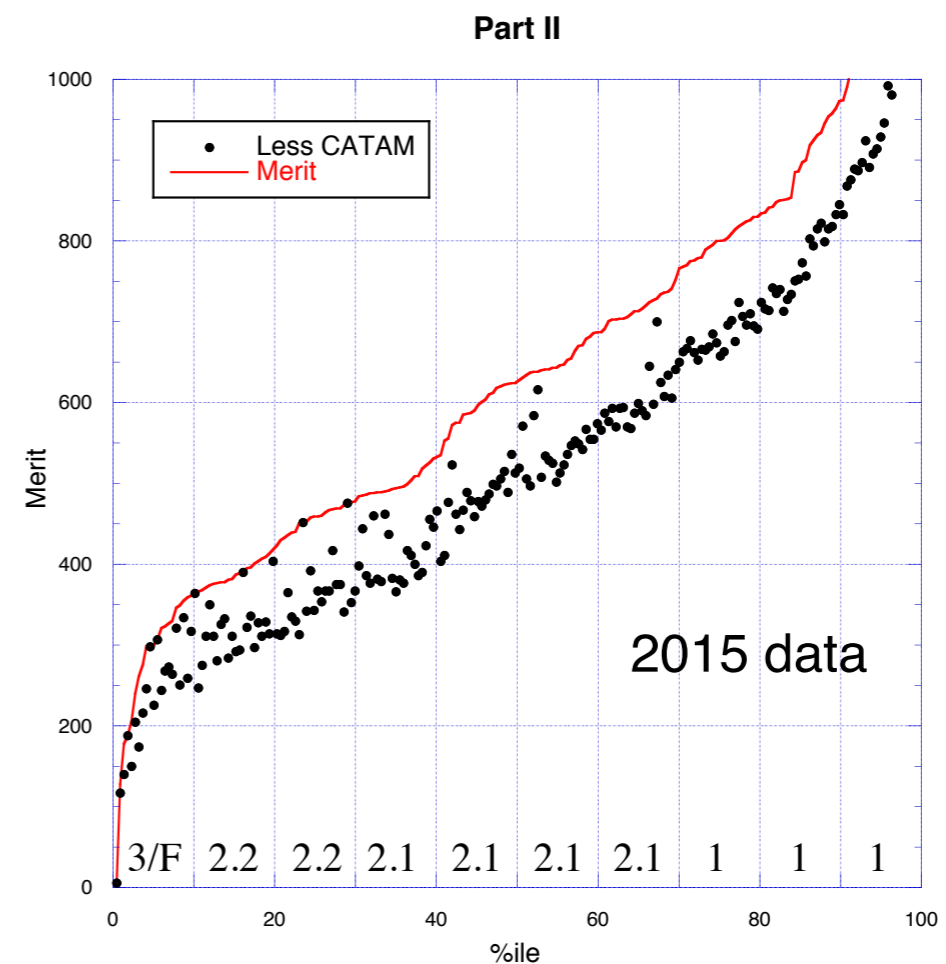
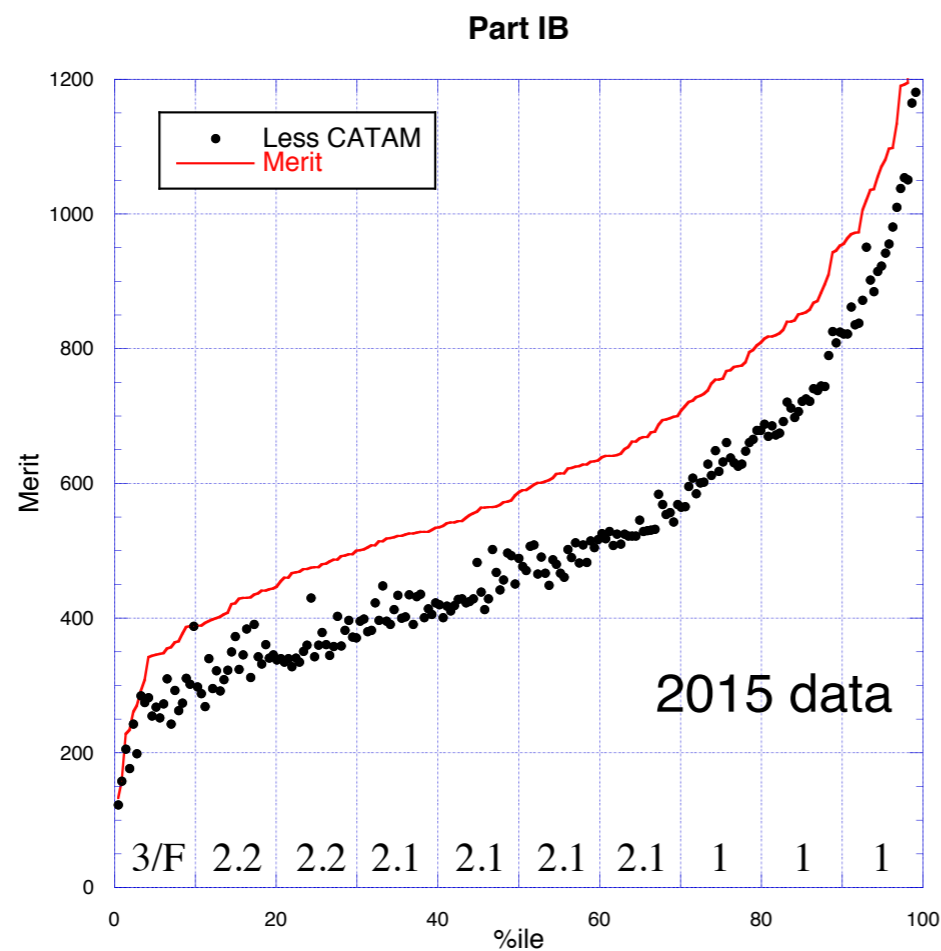
John Taylor - CATAM Director

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- CATAM manual: <http://www.maths.cam.ac.uk/undergrad/catam/II>
- Find these slides (PDF with links) at the CATAM webpage <http://www.maths.cam.ac.uk/undergrad/catam>
- Helpline: catam@maths.cam.ac.uk

Marks available — Part II

- Maximum of 150 Tripos marks
- For the average student, CATAM contributes ~20%
- Credit added directly to marks total: no α or β 's



see [Schedule](#) and [CATAM manual](#) for more detail

Mark counting — Part II

Each project is allocated a number of *units* based on its difficulty

From the CATAM Manual:

To obtain maximum credit, you should submit projects with unit allocations that sum to 30 units. If you submit N units, where $N > 30$ (i.e. if you submit more than the maximum number of units), then the following algorithm applies:

If your weakest project is M units with $M > N - 30$ then the mark on that project will be rescaled by $[M - (N - 30)]/M$. If $M \leq N - 30$ then that project will be discarded entirely, a revised N will be calculated, and the algorithm will be applied recursively.

see [Schedule](#) and [CATAM manual](#) for more detail

Deadline — Part II

- **Wednesday, 29 April 2020, 10am — 4pm**
- There are many reasons to work diligently and finish well ahead of deadline
 - to deal with unforeseen problems including graphs, tables, program listings
 - to *proofread* your submission
 - to have ample time to print/turn in report
- Be aware some projects link more closely than others with lecture courses,
e.g. 10.16 Tennis Modelling Challenge is closely linked with Part II Statistical Modelling.

see CATAM manual for more detail

Academic integrity

- All of you work very hard studying mathematics
- You have earned an examination procedure which respects your efforts
- Achievement of tripos marks by unfair means is an insult to all of you
- We promise to protect the academic integrity of CATAM

Unfair means

Unfair means includes (but is not limited to):

- Copying any person's program
- Using someone else's program or any part of it as a model, or working from a jointly produced detailed program outline
- Copying or paraphrasing someone else's report in whole or in part
- Posting questions on the internet, e.g. StackExchange
- Sharing your work with other students

If in doubt, contact us via catam@maths.cam.ac.uk

see [CATAM manual](#) for more detail

Plagiarism detection

- Unfortunately, upholding Academic Integrity means we all have to undertake some administrative tasks
- Submit **code/programs** *electronically*
 - Comparison with projects submitted this year *and previous years*
- Produce & submit **write-up** *electronically*
 - Checked against Turnitin UK database
- Student declaration form (e-mail to be sent soon)

see CATAM manual for more detail

Consequences of unfair means

From the manual:

If the Chair of Examiners deems that unfair means were used, the case may be brought to the **University courts**. According to the Statues and Ordinances of the University ¹⁴

suspected cases of the use of unfair means (of which plagiarism is one form) will be investigated and may be brought to one of the University courts or disciplinary panels. The University courts and disciplinary panels have wide powers to discipline those found to have used unfair means in an examination, including depriving such persons of membership of the University, and deprivation of a degree.

If you assist someone else in using unfair means (e.g. by providing your report or computer code), you may also be subject to discipline.

see [CATAM manual](#) for more detail

Electronic submission

- Submit your code and write-up electronically
- Free to produce your write-up using
 - LaTeX — Introductory lecture
 - Microsoft Word
 - LibreOffice/OpenOffice
 - most any word processor (see CATAM manual)
- ***Not permitted:*** anything scanned

Part II projects available

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 Demon Algorithm (8)

12. Nonlinear Dynamics & Dynamical Systems

- 12.3 The Lorenz Equations (10)
- 12.6 Chaos and Shadowing (10)

13. Logic & 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)

Have a great year!