

Schedule of Research

Jim Adams 27th December 2015, revised 20th January 2017

Four books on mathematics are to be published, firstly as eBooks.

1. *Elementary methods in number theory*. This consists of early work dating mainly from 2009, collected together in one volume.
2. *Innovation in mathematics*, mainly completed apart from marketing in August 2014, with the last update in May 2015. It has been on the Assayer free eBook website since November 2014. There will be no further updates for this edition.
3. *Superexponential algebra*, in three volumes. Work was completed for volume I in January 2016, volume II in December 2016 and volume III in January 2017. The eBook was released for comments in September 2015, with a posting to the Assayer in October 2015. This eBook is a major teaching work of innovative research. New ideas on novanions, the ineffectiveness of Galois theory and a replacement of the proof of the unsolvability of the quintic without using group theory, and new results on decidability are given. It ascends from discussion mainly of rings, then to exponential structures and finally superexponential algebra. Logic is an integral part of this work. It also deals with probability logics, and amalgamates the previously intended eBooks *Algorithms and consistency* and *Algebra, space and logic*. The original intention was to include work on *Branched spaces*, but this has been hived off to the next item.
4. *Number, space and logic*. The number theory part of this work will deal with the Riemann hypothesis, and include discussion on M algebra, which is the transcendental analogue of the natural numbers, N. The discussion will look at local and function fields in this context. An overarching idea in this work is the combination of explosion/implosion algebra with that of branched spaces, both for superexponential structures and topological generalisations, with logics related to these two, including for multivalued logics.

The work will begin in May 2018, after the work with Graham Ennis on *Pictures of Physics* is complete. Later there will be further non-mathematical work on *Climate catastrophe: What is to be done?*, and after this the website will be marketed, including conversion of parts of it to Chinese, Arabic and Spanish using visual media, and the research topics will be taught.

Jim Adams 23rd August 2014, revised 12th February 2015

Four books on mathematics will be published, firstly as eBooks.

1. *Innovation in mathematics*, completed apart from marketing, in August 2014.
2. *Superexponential algebra*, work ongoing with a scheduled completion of May 2015.
3. *Branched spaces*, work to recommence 2015.
4. *Algorithms and consistency*, to start in 2016.

Jim Adams 24th September 2011, articles as revised 19th July 2013

The articles to be published are

1. An elementary proof of the prime $p = 4k - 1$ asymmetry theorem on quadratic residues, I.
2. An elementary proof of the prime $p = 4k - 1$ asymmetry theorem on quadratic residues, II.
3. Foundations of intricate and hyperintricate numbers.
4. Applications of intricate and hyperintricate numbers.
5. On totient reciprocity.
6. Rescaling linear and polynomial probabilities.
7. Chromotopical algebra.
8. On ladder numbers.

In addition, a popularisation containing material from the Mathematics – Introduction part of the website

9. Innovations in mathematics.

website contents, mainly as revised 25th June 2013

Since the version on 24th September 2011 was put out, I have decided on substantial changes to the schedule. Measuring the time taken already in developing the website, and the stage that has already been taken in writing up the papers, I estimate the maths part of the website is 70% complete, and ought to be finished by May 2015.

There is now a ‘Hyperintricate Overview’ which has collated much of the research on hyperintricate numbers under one umbrella. It has been divided into two parts: Foundations of intricate and hyperintricate numbers, which is scheduled for completion by August 2013, and Applications of intricate and hyperintricate numbers. These are contained in the Mathematics – Matrices section, items 1A and 1B.

The paper ‘An elementary proof of the prime $p = 4k - 1$ asymmetry theorem on quadratic residues’, which was being prepared for publication, was the source of problems in one of its proofs. The paper has now been split into two parts. Part I was completed on 27th December 2011. The remarkable Part II is half complete, and has been split into two, Part IIa, which is mainly finished, and IIb. Part IIb has been shelved until August 2013. If I were to be optimistic, the whole of Part II could be complete by November 2013.

Two completely unscheduled works, ‘Archimedean infinitesimals in uncountable analysis’ and ‘Reflections on zero and infinity’, have intervened, due to prompting by Tim Gibbs. The first phase of the work on infinitesimals was ready on 4th May 2012, and met with substantial opposition from mathematicians. The text has been removed, and a replacement ‘Discussion on Ladder Numbers’, is the replacement. Phase 2, with an axiomatic basis, will be prepared in September 2014, whereas the Reflections paper may also still be subject to revision. Perhaps Reflections is near completion.

All works may be subject to amendment as, when and if new results come along.

Apart from any such innovations being derived, articles 2A and 2B on ‘Intricate and hyperintricate numbers’ in the Mathematics – Introduction section were complete on 27th February 2012.

For ‘Division algebras’, article 3 in Mathematics – Matrices, a planned enhancement (which has entailed taking out the word ‘associative’ in the title) is to extend the result to nonassociative division algebras, for instance to incorporate the octonions, probably using ideas inherent in the ‘Cayley-Dickson construction’. This is scheduled for completion by August 2013.

‘Rescaling polynomial and linear probabilities’ is complete. The section mentioning homology and cohomology has been removed, and has been replaced by a section on sheaves and toposes.

‘Hyperintricate exponential algebras’ was scheduled for completion by the end of August 2011. It has now been split into two, and Chapter VI of the overview, Foundations of intricate and hyperintricate numbers, is complete. For Chapter VII the essential task was to deal with a suitable assignation of

$$[g^{a+bi+c\alpha+d\phi}]^{p+qi+r\alpha+s\phi}$$

in terms of

$$[g^{t+ui+v\alpha+w\phi}].$$

The work on Chapter VII reached its preliminary conclusion on 29th August 2011, contrary to my expectations. There have been amendments and additions. It was ready on 29th July 2012.

As of June 2013 a decision has been made on the contents of Applications of intricate and hyperintricate numbers, which will contain material on noncommutative rings, ideals, noncommutative varieties, Riemann Roch, elliptic functions, hyperintricate Fourier series, Kloosterman sums, L-series and finally superexponentiation. This is not due for completion until the end of 2014, except for the superexponentiation section, which will be later.

Part 1 of ‘The concept of branched retract spaces’ has been completed. Part 2 is now called ‘Chromotopical algebra’ and is scheduled for completion by November 2014 and Part 3, which will be in the Physics section, by January 2016.

‘Polynomial equations for non-commutative algebras’ is in some senses the earliest of the works and the original schedule was to complete by September 2012. There are two phases to construction: the semi-classical results, which will include the Galois solvable cases for J-abelian hyperintricates (this phase is almost complete), and subsequent extensions, which includes non-J-abelian hyperintricate solutions, perturbation techniques for polynomials, nonassociative Galois theory and a section on elliptic function methods. It would be highly optimistic, given the slow nature of previous progress, if this could be completed by November 2013. Previous work on Galois theory will be subsumed under the work on Hyperintricate rings in volume II of the overview.

‘Fermat’s little theorem for matrices’ was completed in December 2012.

‘Hyperintricate Number Theory’ contains unscheduled work, and work on quadratic residues, which has been transferred from ‘Fermat’s little theorem for matrices’. The quadratic residues part should be finished by October 2013.

Work on ‘Hyperanalysis’ was started in April 2012. It is now on the website, and will include additions on hyperintricate transforms, Cauchy’s theorem, and modular forms.

The original work on ‘Braids’ has been found to be the wrong idea, and has been removed. The replacement is now subsumed in the work on Chromotopical algebra.

Part I of ‘An elementary proof of a theorem on quadratic residues’ was completed on 27th December 2011, Part II will be ready not before November 2013. These await translation to L^AT_EX and feedback from mathematicians, before being submitted to a journal.

There are now additional papers on the website: on Totient Reciprocity (my translation of a paper by Eistenstein is also included and is relevant to this work), Beal’s Conjecture, and two extensions to the work on Chromotopical Algebra. Only the first is ready.

‘Exponential factorisation theorems’ is juvenilia, it is complete (although further checking is required) and will not be published externally.

‘Vector calculus’ was subject to incremental insertions frequently. It is semi-complete and will not be published externally.

‘Superexponentiation’ is there for documentation of my claim to be the discoverer of the hyperintricate representation. It will forever be incomplete, and if and when a work on superexponentiation is written, it will be after October 2013.