AN ITERATIVE CONSTITUTION
Dynamics of a rule-based system require adequate visualization

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A constitution is a set of rules which define other rules: a rule-generator. Those rules (the legal system) guide behaviour, and, when transgressed, activate the legal system-proper. Normally the ruleset is changed iteratively in a common law system via referenda for major changes, and via precedent through stare decisis for smaller changes. Is there a way to represent the Irish legal system graphically, given that we know legal reasoning and language to be one of Wittgenstein’s Language Games? If so, is the outcome of the evolution of the system decidable beforehand? If not, then the constitution cannot iterate sufficiently quickly, and is in fact ‘emergent’. Constitutional reform is therefore always and everywhere a suboptimal hill-climbing problem. We will never know what the best outcome of changing the constitution might be. The best we can do is map the likely changes, and compare them.

WITTGENSTEIN\(^1\) felt that legal reasoning was an example of a ‘language game’, where the level of language used in legal reasoning could not be reduced to simpler statements. One could not write a child’s book, however long, on case-law, or constitutional reform, without losing vital meaning in the process.

If we cannot reduce legal reasoning to truth-tables, and via truth-tables to an algorithmic description of the legal system, then how can we a priori deduce which set of iterations to the constitution is a ‘good’ set of changes, and which set of changes are bad? If we can’t reason in terms of optimal legal structures, and deduce generative rules for those structures, then can we talk sensibly about reforming our constitution?

At a less abstract level, remember, the population voting on the referendum may make the ‘wrong’ choice in terms of overall social welfare or in terms of the trajectory of society as a whole; the constitutional reform may be specified by policy-makers incorrectly. The implementation of that reform may well be sub-optimal and not quite to the spirit of the amendment, and finally, case law may bend the spirit of the intended constitutional change somewhat. Uncertainty abounds when it comes to constitutional change.

A second republic?

The function of any constitution is to set the ground-rules for the development of a legal system, within which citizens make choices about which rules to follow, and which rules to break. The recent macroeconomic turmoil, caused in part by poor governance at the state and corporate levels of society has led commentators to call for a ‘second republic’, with commentators thinking of constitutional redesign.

Suggestions for this redesign range from electoral reform of our bicameral system, changing the roles and responsibilities of the elected representatives within the system (TD versus sitting minister, etc), gender quota and fixed terms for office holders, and a new set of punitive regulations to ensure probity in public and corporate life.

I’m not an expert in this area of constitutional reform, but I do know something about computation, so in this talk, let me say something about the intersection between a rule-generating initial condition, and the changes to behaviour implied by a change of initial condition, especially the presence of irreducibility—the problem of Wittgenstein’s language game—and the institutional inertia one will certainly encounter when trying to change the status quo.

Computing the future

Start with any simple rule, and iterate it forward. Normally the iteration results in a boring, step-wise pattern. Occasionally though, the rule results in a totally unpredictable pattern which cannot, a priori, be computed. This is one of the hallmarks of a complex system, and the pattern which results is said to be emergent. The legal system is one such pattern.

Beginning from the constitution, a very small set of rules, the legal system iterates forward in time, case by case, until the system is extremely interconnected. Importantly, one could not foresee the shape of the system, just from studying its initial rule set. The figure below traces out a sequence of steps in the evolution of a simple symbolic system. At each step, each boxed region is transformed by applying the same rule, again and again—what’s happening is the logical extension of the simple generating rule (the small piece at the top) being added to iteratively.

The point is simple: with any sufficiently complicated set of initial rules, computing the future state of these rules is almost certainly impossible. We cannot, in the presence of an irreducible language game like legal language, with a complicated set of initial conditions, like the constitution of Ireland, know first hand what effect a revised constitution will have on the legal system.

Several studies\(^3\) look at mathematically formalising the *United States Code* that incorporates its important qualitative features including hierarchical structure, explicit interdependence, and language. Once a baseline has been established (a year, say), the changes to the Code can be visualised. The study of constitutional reform should, in my opinion, begin here, for while it is impossible to predict the outcome of any change over many periods, it is possible to visualise change to the legal system over time, to get a sense of just how previous changes have effected the system.

**Conclusion**

I’ll end this short talk on a positive note: here’s a simple challenge to legal scholars who wish to understand the effects their suggested constitutional reforms might have on the Irish legal system:

1. Invest time, and money, in mapping the Irish legal system;

2. Try, insofar as possible, to simulate incremental constitutional changes using available software, theory, and empirics;

3. Attempt to understand constitutional reform in terms of the design of a rule-generator, as opposed to more traditional legal frameworks.