Mathematica Successūs

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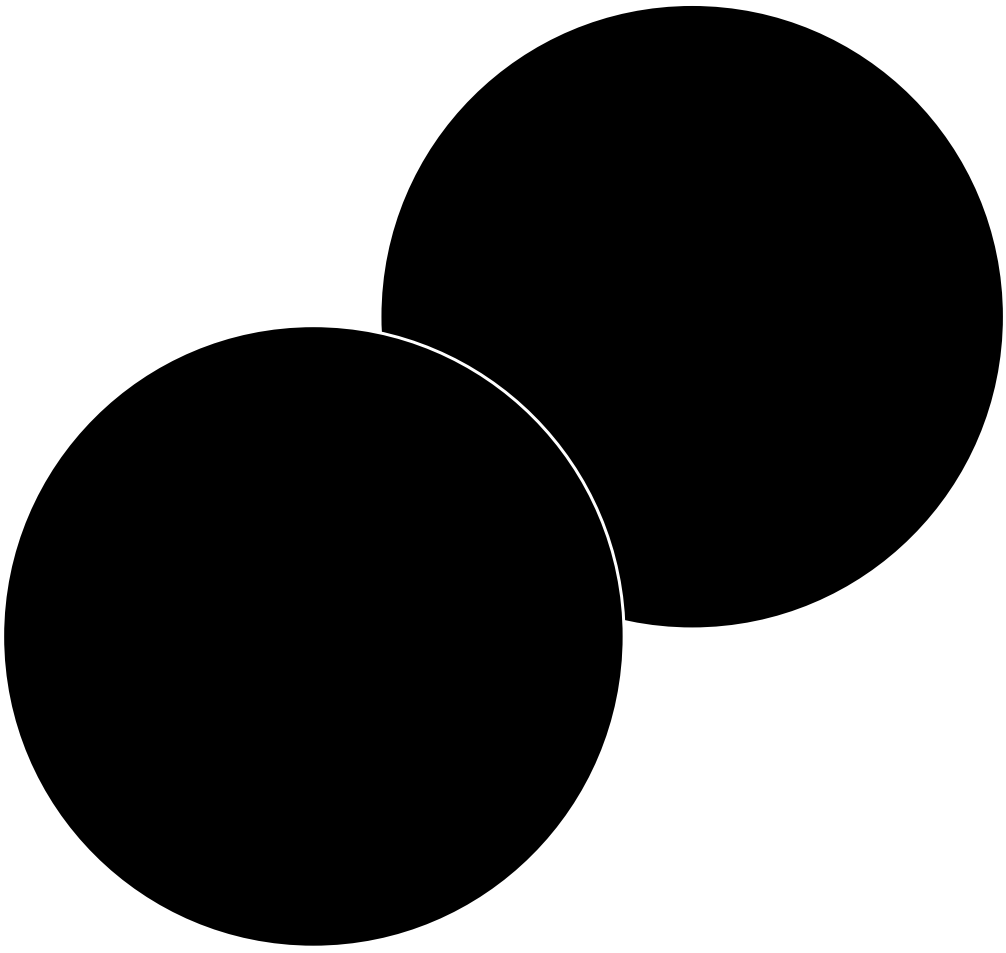

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Mathematica Successūs: A Formal Approach on Success, Systems and Self

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Goal of This Book

This is a short book for people who can read mathematics but are not yet where they want to be in life. Basically, it is a book written for my past self.

The aim is very specific:

- to describe *success* in any domain as a system that can be modeled in the language of sets, functions, probability and control;
- to extract from this modeling a few *hard constraints*—laws of success—that are as unforgiving as the laws of logic;
- to show how these laws connect to my own life: to things that failed, things that worked by accident, and things that started to work only when I saw them as mathematical objects.

The goal is not to sell hope. The self–help industry has a financial incentive to promise that "anyone can make it" if they buy just one more course. This book has a different promise:

> If you can follow definitions and proofs, you can get a toolbox for steering your life that is precise, brutally honest and reusable in any domain.

These tools will not remove luck, inequality or politics. They will not make institutions act in your interest. They will, however, help you see clearly *which parts of your success are under your control, which parts are structural, and where pushing harder is mathematically pointless.*

Structure. The book has five main chapters:

1. **Being** — what actually is; states, self and essential variables.
2. **Space** — what could be; possibility spaces, information and uncertainty.
3. **Change** — how states move; dynamics, feedback and learning.
4. **Goal** — what we call "success"; utility, decision and strategy.
5. **Application** — how to use the framework; a worked example of learning an ultra—hard skill.

Each part mixes formal definitions, small theorems and short notes from my life. Sometimes the math will look much more serious than the examples. That is on purpose: I want the theorems to stay true even when my own stories are wrong, biased or incomplete.

Contents

Chapter 1

Being: States, Self and Essential Variables

This chapter answers the first question: *what actually is*? Before we can optimize, we must be clear about what exists in our model of the world. We will build a vocabulary of states, selves, and essential variables. These definitions form the foundation for everything that follows: they allow us to speak about change (Chapter **??**), possibility (Chapter **??**), and finally success (Chapter **??**).

1.1 World as a Set of States

We start from the dullest possible place: a set.

Definition 1.1 (World)**.** A *world* is a nonempty set X. An element $x \in X$ is called a *state*.

At first, this looks too abstract. But almost every serious textbook you know starts this way: set theory, analysis, probability, control.[1] Why set theory? Because sets are the simplest structure that lets us talk about "things" and "collections of things" without any additional assumptions. Once we have sets, we can define functions, relations, and eventually all the machinery of probability and control. Starting anywhere else would smuggle in hidden assumptions.

In this book, X is "whatever matters for the success story we care about", it is the "everything". It could be:

- your health, money, social ties and knowledge;
- the state of a company (cash, product quality, relationships);
- the state of a market, a political system or an ecosystem.

First challenge. In real life X is enormous and mostly unknown. You never see the full state. So the first move in any serious attempt at success is already a lie: you choose some simplified X and pretend that it is "the world".

Remark 1.1 (Modeling honesty)**.** You will never get away from this. The trick is to be explicit:

> "This is my model X. It forgets many things. I am using it because it is simple enough that I can compute decisions. I accept that using this model means I might win locally and lose globally."

[1] For example, a classic set theory text builds *everything* from sets and membership relations.

1.2 The Self as a Subsystem

In most self–help books the author talks about "you" as if it was obvious what that word means. Here we will be slightly more precise.

Definition 1.2 (Self)**.** Let X be a world. The *self* is a distinguished subsystem

$$S \subseteq X$$

together with some variables we can influence, called *controls*.

In practice, S includes your body, your brain and the artifacts you can reliably use (phone, notebook, routines, money).

When I was younger, my mental model was different. I felt like a point moving through time, and everything outside my skin was "the world". Later, when I read about systems and control, I realised that this view was too small. A well–designed routine or a computer script is as much "me" as my hand is. It is a piece of my extended self, because it moves when I choose and keeps moving even when I forget.

1.3 Variables and Observables

We do not see states directly. We see measurements. This is not a philosophical curiosity but a hard constraint: as finite beings, we cannot observe all states the world presents us. We must map them to something we can grasp—numbers, categories, symbols. This reduction is what observables do.

Definition 1.3 (Observable)**.** Let X be a world. An *observable* is a function

$$Y : X \to V$$

from states to some value set V (numbers, categories, vectors, ...).

Examples:

- bank balance $B : X \to \mathbb{R}$ (in theory),
- body weight $W : X \to \mathbb{R}$ (in theory),
- number of close friends $F : X \to \{0, 1, 2, \dots\}$,
- subjective mood $M : X \to \{-2, -1, 0, 1, 2\}$.

You only get to interact with the world through a finite list of such observables and a finite list of actions. Already here a first law of success appears.

Principle 1.1 (Representation precedes optimization)**.** You can only optimize what you can represent as an observable.

If something important is not tracked anywhere—not in your notebook, not in numbers, not even in a short phrase—then in the mathematics of your life it does not exist. You will sacrifice it accidentally.

Remark 1.2 (The cost of implicit variables)**.** If you optimize only for what you measure and ignore what you do not, you will inadvertently degrade the unmeasured dimensions. The fix is simple but requires discipline: identify what matters to you, make it observable, and include it in your objective. Once you track sleep alongside productivity, or relationships alongside achievement, your behavior shifts naturally because the optimization surface itself has changed.

1.4 Essential Variables and Survival

There are variables that *must* stay in a certain range if we want to survive and survival is the foundation of any success.

We should make a sharp distinction between variables that *must* stay in a certain range and variables that can swing freely.[2]

The essential variables are the super set that limits us from below. No matter how much money we make, if our health markers go out of range, we fail. Later in this book we will introduce reachable **??** sets, the essential variables are the largest reachable set that still allows survival.

Definition 1.4 (Essential variables)**.** Let $E = (E_1, \ldots, E_k)$ be a list of observables $E_i : X \to \mathbb{R}$. A subset $R \subset \mathbb{R}^k$ is called the *survival region*. The system *survives* as long as

$$E(x) \in R.$$

In biology, the E_i are things like blood pressure, temperature, oxygen level. The survival region R is the range in which the organism can stay alive. The world throws disturbances at the organism; the organism acts to pull E back into R.

This idea scales to life design:

- health markers (sleep, pain, energy),
- finances (cash buffer, debt level),
- relationships (number of people you can ask for help),
- integrity (how often you lie to yourself or others).

Remark 1.3 (Life–level survival)**.** You can define your own vector of "essential variables". Then you can declare:

> "I am *not* successful if any of these leaves its survival region, even if I make a lot of money or get a lot of attention."

This sounds moral, but it is also mathematical. It defines a region in state space where "failure" is guaranteed no matter what other numbers say.

A very brutal lesson of systems theory is:

Principle 1.2 (First law: stability before optimisation)**.** If your essential variables are not stable, optimising secondary variables is mathematically meaningless.

If your cash buffer is near zero, your body is falling apart and your relationships are collapsing, then trying to "maximise learning" or "maximise impact" is like maximising a function outside its domain.

I did exactly this at some point. I tried to do hard academic-level math and business while sleeping little, carrying chronic stress and ignoring my bank account. From the outside it looked heroic. From the inside it was just a system violating its own survival constraints, slowly but systematically melting down.

[2] The classic reference is Ashby's work on essential variables and regulation.

1.5 Success as a Property of States

We can now speak about success without poetry.

Definition 1.5 (Success predicate)**.** A *success predicate* on X is a function

$$S : X \to \{0, 1\}$$

that is 1 for states we call "successful" and 0 otherwise.

The important thing is that S need not be global. It is almost always *personal and local.* For one person, "success" means having a stable, low–stress job and a warm family. For another, it means high risk, high status, public impact.

Remark 1.4 (No universal success set)**.** There is no single subset $S^{-1}(1) \subset X$ where everyone agrees that those states are "true success". Any book that talks as if there was just one is either selling ideology or a product.

What we *can* do, objectively, is to show constraints that any S must obey if you want it to be reachable from where you are, given the structure of the world and your own limits. That is what the next chapters do.

End of Sample

This is a sample version. To get the full book, please visit the author's website or on Amazon: https://www.amazon.com/dp/B0FHG3SBV5/