The Metaversalist Argument That
the Probability of God is 1

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Abstract

Metaversalism is a rational philosophical system based on certain insights from modern mathematics, theoretical computer science, and general scientific principles. It starts by arguing that the only logically coherent notion of existence is the mathematical one – that is, the foundation of reality is the "Metaverse" consisting of all well-defined, computable abstract structures. From this, we can infer a number interesting metaphysical, spiritual and theological consequences, such as: (1) all possible universes exist, as surely as ours, (2) all souls (suitably defined) are immortal, (2) not only does a god exist, but *all possible* gods (suitably defined) exist. In this paper we show how to prove, in the context of Metaversalism, under certain plausible assumptions, that in fact there is probability 1 that at any moment our universe can be controlled/influenced by a God (any sufficiently powerful god), if he/she so desires.

1. Introduction

The intellectual foundation that leads one to Metaversalism is a sufficiently thorough education in modern science, including, most particularly, mathematical logic, theoretical computer science, various branches of higher mathematics, and theoretical physics. Exposure to modern biology, neuroscience, and artificial intelligence is also helpful.

The starting point for Metaversalist thought is the realization that the traditional naïve philosophical concepts of what *existence* means are without merit, and that the only coherent notion of existence is *mathematical existence*: A thing *exists* if, and only if, it has, in principle, a self-consistent mathematical description. The idea that there is some other kind of existence (called "physical existence," say) that is distinct from mathematical existence is philosophically useless; since any such existence property is entirely untestable (not possibly verifiable nor falsifiable), has no logical consequences, and ultimately no meaning; and thus, by Occam's Razor, it a superfluous notion that must be entirely eliminated from any further consideration.

This realization immediately implies that our universe (like any possible universe) *must* exist (in the only meaningful sense – the mathematical one), assuming only (as modern physics strongly suggests) it has a self-consistent description as a computable mathematical structure. Therefore, no deliberate act of will by a sentient creator is necessary for our universe, and for ourselves, to exist. This should make atheists happy.

However, perhaps surprisingly, this rationalistic line of thought, if pursued a little more deeply, also leads one to a broad array of meaningful and important spiritual and theological conclusions, including the conclusion that, although a God is not necessary, if we make certain minimal additional assumptions, the probability of there being a God (any particular God satisfying certain criteria) that can influence/control our universe is in fact 1. In this paper we outline the proofs of these assertions.

2. Basic Definitions

In this section, we define the meaning of some basic spiritual/theological terms within the framework of Metaversalist thought.

Definition 1. *Souls.* In Metaversalism, a *soul* is simply defined as the abstract pattern of a conscious information process.

We do not attempt to define *consciousness*, but we assume (in line with Strong AI) that a conscious being is simply a special case of an information process (a computation). We believe this assumption is justified, because do not believe that the concept of any kind of process *other* than an information process is even a coherent notion. *Any* conceivable process is ultimately, at root, a computational one. Any being would have to operate with a "physics" of some sort, but the idea of a non-computational "physics" is incoherent; *any* physics would have to have a mathematical model, and any mathematical model is, at some level, computable.

We note that, from this definition, it immediately follows that souls are immortal, since any mental state can (and will) be continued, beyond any given point, by some possible computation. A given soul's instantiation within one particular universe may end, but that soul always continues to exist and evolve in *some* possible realm in the Metaverse.

Definition 2. *Gods.* A *god* is, generically, any being who (a) is sentient, and (b) is possessed of unlimited computational resources.

We assume that there are possible universes in which living beings can arise spontaneously and evolve to the point of (a) attaining sentience, and (b) eventually attaining mastery of unbounded computational resources. In fact, our own universe may be one of these – we have already achieved sentience, and it is conceivable that we'll eventually discover the "ultimate" laws of physics to have loopholes that will allow for unbounded amounts of computation to be carried out over the (possibly infinite) future history of our universe. We can imagine someday "uploading" our consciousnesses into a self-maintaining, universe-spanning computer, and thereby *becoming* gods ourselves.

If we consider it possible that we – or at least, a race of beings that could evolvein *some* possible universe – could eventually do something like this, then it follows that there are indeed realms in the Metaverse within which gods exist. In fact, since there are many ways this could happen, there is an infinite variety of gods (with different "personalities" and preferences) that come to being in this way.

One thing that a god can do, if he (she) wishes, is "create" new universes by simulating them using his (her) computational resources. In fact, a god can create and explore *all possible* universes, or any subset of them (finite or infinite) that he/she wishes. Further, there must be at least some copies of our universe (identical to ours, from the point of view of the perceptions of the beings within them) which are being simulated in this way. Clearly, a god has the ability to influence a universe he is simulating, if he wishes, by tweaking the simulation. (However, he cannot influence other copies of the universe that are not under his control, which in general will also exist.)

Definition 3. *Demigod.* A *demigod*, for our purposes, is like a god, except that the demigod's computational resources are not necessarily infinite, just very very large – in some cases, large enough to simulate universes that spontaneously evolve sentient beings within them.

Thus, some instances of our universe could be under control of beings who are just demigods, rather than "true" gods. Even if humanity never attains truly godlike power, we may still attain demigod status. The line between gods and demigods is actually somewhat fuzzy – since some instances of a given demigod may continue forever – giving him godlike status – while others die out early.

3. Probability of God

We assume that there is some (as yet undiscovered) objective criterion (a probability measure) which allows one, in principle, to assess the probability that any given universe (set of observations) is generated by any given larger metaphysical context that is consistent with those observations. This hypothetical measure would just be an extension of what science does routinely – namely, evaluating the probability of competing theories. Some candidates for the "ultimate measure" include the *maximum entropy* (maxent) principle, a powerful technique for assessing the probability of theories in situations where many details are unknown, and Bayesian methods, which integrate prior probabilities with evidence obtained from data. The maxent and Bayesian methods can even be unified in a single framework; e.g., see http://arxiv.org/abs/1011.0723.

In any event, supposing that there is such an "ultimate measure," and given any particular model of what one means by God (within the scope of the general definition of gods given above), we can in principle say, for our universe, what is the probability ε_0 that our universe (by which we mean, a randomly-selected instance of our universe) is being directly simulated by that God G.

In general, for a given God G who may have an elaborate character and back-story, and thus who may thus be an extremely rare and particular being, this probability ε_0 could be very, very small – for example, perhaps only 1 in a googol (10^{100}), 1 in a googolplex ($10^{10^{100}}$), or less. But, let's assume that ε_0 is, at least, greater than 0.

Now, there is then a portion $p = 1 - \varepsilon_0$, which may be very close to 1, of the total probabilistic "support" of our universe that is ascribable to immediate contexts *other* than G. For example, we could have our universe embedded within an "eternal inflation" model, or a model where the entire as-yet-undiscovered correct "Theory of Everything" of our universe's physics is being executed by a simple, dumb Turing machine, and so forth and so on. The space of alternative contexts can include all of the various kinds of models not involving any sentient creator that are favored by atheists.

However, for any *particular* alternative (non-sentient) model m, we then must ask, what is the metaphysical context of *that* model? On what "platform," so to speak, does *that* model run? We then can, in principle, using the "ultimate measure," derive some probability ε_m that the model m is being run by G, the same old God as before.

Assume, now, that over *all* alternative models m, there is a finite lower bound $\underline{\varepsilon}_1 = \inf \{\varepsilon_m\} > 0$ on the probability ε_m that the model m is being directly simulated by G.

Then the total measure (so far) of ways that G could be overseeing our universe (either directly, or indirectly, through 1 level of indirection) is lower bounded by $\varepsilon_0 + (1 - \varepsilon_0)\underline{\varepsilon}_1$.

We can then repeat this process at higher levels of indirection. For a particular model m, within which our universe is embedded, it has probability at least $p_1 \geq 1 - \underline{\varepsilon}_1$ of being embedded in another "simple, dumb" model instead of in G. Let m' be one such model. Then we can consider the probability $\varepsilon_{m'}$ that m' is directly embedded in G. Then we can assume a lower bound $\underline{\varepsilon}_2 = \inf\{\varepsilon_{m'}\} > 0$ over these probabilities. And now the total probability of finding G at the 0th, 1st or 2nd levels of indirection is at least

$$p(G) \geq \varepsilon_0 + (1 - \varepsilon_0)[\underline{\varepsilon}_1 + (1 - \underline{\varepsilon}_1)\underline{\varepsilon}_2]$$
$$= \varepsilon_0 + (1 - \varepsilon_0)\underline{\varepsilon}_1 + (1 - \varepsilon_0)(1 - \underline{\varepsilon}_1)\underline{\varepsilon}_2.$$

We can continue this progression *ad infinitum*, through an unbounded number of levels of indirection, in which case we get:

$$p(G) \geq \sum_{i=0}^{\infty} \underline{\varepsilon}_i \prod_{j=0}^{i-1}(1 - \underline{\varepsilon}_j)$$

where we define $\underline{\varepsilon}_0 = \varepsilon_0$. Now, suppose further that there is a finite lower bound $\underline{\varepsilon} = \inf\{\underline{\varepsilon}_i\}$ over all the various $\underline{\varepsilon}_i$, for all i from 0 to ∞. That is, assume the probability of a structure's having G as a "parent" context does not approach 0 as we go to ancestor structures through more and more levels of interaction. Then the above expression is lower bounded by:

$$p(G) \geq \underline{\varepsilon}\sum_{i=0}^{\infty}(1 - \underline{\varepsilon})^i$$
$$= \underline{\varepsilon}\frac{1}{\underline{\varepsilon}}$$
$$= 1.$$

You can check the solution to the summation of the infinite series (which is valid for any value $0 < \underline{\varepsilon} < 1$) using any modern symbolic math tool, such as Wolfram Alpha, *e.g.* http://www.wolframalpha.com/input/?i=\sum_{i%3D0}^{\infty}+(1-\epsilon)^i. And of course, since the probability $p(G)$ cannot be greater than 1, we have that $p(G) = 1$.

Therefore, as long as the God G satisfies the assumptions made in the above derivation, it is absolutely certain that, if one "pops up" from our universe to a random possible "parent" context repeatedly until arriving at G, one will *eventually* (after some finite, but indefinitely large number of steps) arrive at G.

This should be unsurprising, because the lower bound $\underline{\varepsilon}$ essentially defines a minimum probability that we will encounter G when popping up from any given "ancestor" structure within which our universe may be embedded; if there is a nonzero probability of finding G at each step, it is guaranteed we will find him eventually if we just pop up enough levels. When traversing a random chain of ancestors, we should

expect to pop up through no more than about $1/\underline{\varepsilon}$ levels, on average, before encountering *G* for the first time.

So in other words, if the probability that *G* comprises the immediate surrounding context of any given structure is at least $\underline{\varepsilon} > 0$, then it becomes more likely than not that *G* is among the first $1/\underline{\varepsilon}$ or so levels of ancestor structures to our universe. *E.g.*, if $\underline{\varepsilon}$ is 1 in a trillion, then we should expect to run into *G* about a trillion levels up. And if we are willing to go as many levels up as necessary, we become certain to run into *G* eventually.

Of course, the same can be said for any god *g*, so this proof does not actually single out any particular god *G*. All sufficiently powerful gods (that is, all those for whom the assumptions in this proof are valid) are, with certainty, "ancestors" of our universe. And, if the proof's assumptions hold for a given *non*-sentient universe-generating mechanism *M* (*e.g.*, a simple automaton that systematically runs all possible computations in parallel), then the proof's conclusions hold for *M* as well.

4. Conclusions

We have shown that, assuming only that the probability of God (any god) being the immediate creator of any given abstract structure is lower-bounded by a nonzero constant, it follows that it is an *absolute certainty* that this God will be found in any randomly selected chain of the possible "ancestor" structures to our universe (structures within which our universe is embedded).

What are the theological conclusions of this theorem? It would appear that, in principle, assuming that the proof's assumptions are valid for a given God *G*, it then becomes a certainty that that God could, if he chose, affect our universe's evolution in any way that he wished. Since, even if our universe is removed from Him by a trillion (or a googolplex) levels of indirection, He could, since he has (by definition) unlimited computational power over his realm (the structures embedded within him), still observe what we are doing through all those levels of indirection, and could reach down and halt the simulations at every level, and rearrange them to suit His whims. But whether He actually would care about and/or interfere with events that are many levels removed from His own plane of existence is another matter entirely. So, the ultimate implications that this particular theorem of Metaversalist philosophy might have for life in our own world are unclear. But it seems to be an interesting observation, nonetheless.

It is hoped that further study of Metaversalist ideas will eventually lead us to a better understanding of the structure of the Metaverse, and of the probability measures that may be defined over it, which we hope will, over time, provide a firmer foundation for the scientific investigation of spiritual and theological questions such as these.