Research Article

Negation of the Separatedness-Based Framework as a Methodological Principle

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It is shown how a negation of the assumption that the physical phenomena are representable accurately by separate mathematical points offers a reliable method, which allows to: predict correctly certain empirical findings, anticipate and indicate a source of specific shortcomings or difficulties faced by different models and theories, give an alternative interpretation and possibly an independent justification to various concepts considered currently in the literature in relation to actual observations or thought experiments.

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1. Introduction

Current models of different physical phenomena typically represent their objects of interest (e.g. systems, states, events, or other entities), by what can be considered separate mathematical points, usually organized into an abstract space of some sort. For instance, the state of a system in classical mechanics represented by a real-valued point in the phase space of a given theory, the state of a system in quantum mechanics represented by a complex-valued vector in a Hilbert space, or spacetime represented by a manifold with various functions defined at each of its points[1][2]. In such an approach the objects, or values of physical quantities, as represented by the points, can be either two (or more) points distinct from each other (regardless of some possible overlap between the actual contents, e.g. states, that each of the points stands for) or, alternatively, one and the very same point. The points are typically considered zero-dimensional objects, thus having no size (or shape), and described using real numbers, with infinite numbers of digits, which implies an infinite precision of their determination (which is common both for spaces considered continuous as well as discrete ones, that is, with discretely-spaced points).

The notion of infinity, as appearing in physical theories, has long been considered conceptually suspect, and it is rather doubtful whether infinities actually exist (in some sense) or can be an accurate description of physical phenomena[3]. They would suggest, in particular, a possibility of infinite information being contained in a finite volume of (physical) space. And since the mathematical points, as described by the infinite-precision numbers, are considered themselves to have no size, one could argue, to begin with, that it is not sensible to posit that any concrete physical 'thing' could actually be composed of elements each having literally no size. As an alternative to such infinitely-precisely determinable entities, suggested as a possible remedy for such conceptual difficulties on the fundamental level of numbers used to describe the physical phenomena, introduced recently was as a notion of finite-information quantities, with each such quantity to be considered as having a discrete (i.e. 'thick', 'extended') interval of values associated with it[4]. Since this implies an inherent indeterminacy of such a single quantity's actual value (but due also to its other characteristics), it may thus turn out to be a more natural notion for description of quantum mechanical systems[5] but compatible with and applicable also in classical physics[6].

In previous work[7][8] we argued however that the 'problem of points' will pertain also to such a discrete intervals (as well as to other related notions that could be derived from or based on it; which we thus all count as 'points'), since, if such interval is taken to constitute a set of values as located between its two respective end-points (e.g. an interval of numerical length 1.0, centered at 1.0 and spanned on the real line between 0.5 and 1.5), essentially the same argument will apply to those end-points (or actually to any one of all the points that the interval supposedly encompasses). What we consider problematic is thus the general notion assuming the separate points, regardless of their (relative) 'size', which we called a separatedness-based framework (SF), suggesting that construction of an alternative mathematical notion is desirable and might be possible (Fig. 1). Here we will primarily show that, and how, a negation of the SF might actually offer a reliable methodological tool, allowing to correctly assess certain aspects of different models of physical phenomena and predict empirical observations.

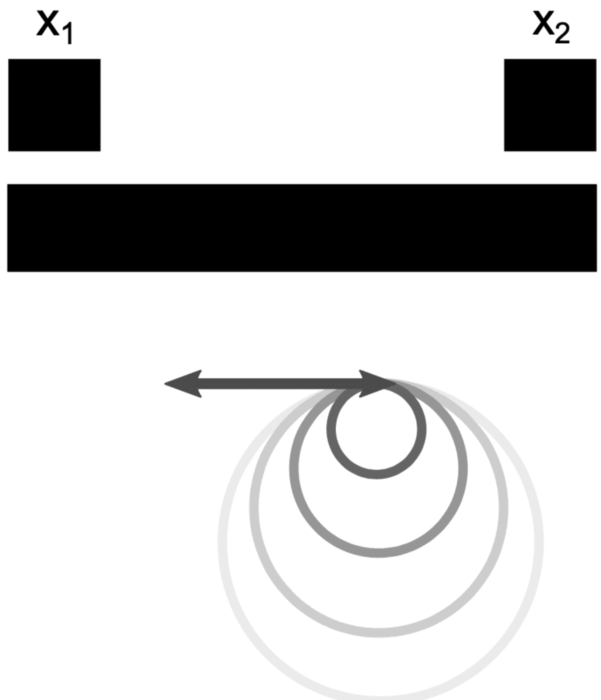

Figure 1. Separate points vs a tentative alternative.

The organization of the present paper is as follows: we in Sec. 2. restate succinctly our main thesis concerning the mathematical objects used commonly to describe and model the physical phenomena, 3. describe two general types of consequences to which it immediately leads, 4. frame those as amounting to a methodological principle, a 'method' that can be used when approaching or formulating different putative models of physical phenomena, 5. show that the proposed method might actually work, 5.1. primarily by giving some concrete examples of empirical findings where it allows arguably to formulate predictions (or, actually, post-dictions) in agreement with what has actually been observed, 5.2. then also by demonstrating indirectly its potential usefulness, namely by showing how it might naturally lead to certain concepts (more or less credible or well-developed) that are actually considered in the literature, in different contexts, in particular as potential explanations of various actual results or thought experiments, giving thus an alternative interpretation and potential independent justification to some of such concepts, while indicating certain theoretical difficulties the appearance of which the method would suggest to expect, 6. consider what exactly might be the nature and properties, and how they could be inferred, of the alternative mathematical object that is implied by our main thesis, and 7. give some final remarks and conclude the work.

doi.org/10.32388/1OSESK

2. The postulate

Consider a single postulate: the physical phenomena are not representable accurately by the notion of separate points.

3. The consequences

What does such postulate entail? Since the physical phenomena do tend to be represented by such separate points, we posit that it implies that two general types of situations will occur (which can be further subdivided into more fine-grained categorizes, however the argument will remain essentially the same), namely, whenever some physical phenomenon is taken (i.e. assumed, hypothesized, modeled, theorized, etc) to be:

1. (a) a one and the same object or ’thing’ (in the broad sense of the term), or (b) to be described by a quantity having one specific value (being, in itself or perhaps in different putative circumstances, the same, or constant)–it should eventually turn out that it is in fact not really so.
2. (a) two (or more) objects or ’things’ being strictly distinct from each other, or (b) to be described by a quantity taking two strictly distinct values (perhaps in different situations)–it should, similarly, eventually turn out that it is in fact not really so.

4. The method

We suggest that these two general points can be framed together as a methodological principle, to be used when approaching different models or theories describing putatively some physical phenomena. What it would say is the following: whenever one finds in a model of some sort a commitment to an assumption of the type as made in, respectively, (1) or (2) above, one can expect that it does not hold strictly and there must be some way, for which one should therefore look, in which it fails and so the corresponding phenomena are in some way different[1] than what is being expected in the given model, not satisfying the criteria of the initial assumption.

5. The application of the method

5.1. Emprical examples

We will now give some concrete examples, which can be seen as falling into one of those two categories, related to actual empirical findings (with some of them considered historically as rather unexpected). The assertions that had been made in different models are for instance the following:

- (1a) The whole atoms, or sub-atomic particles, are each a simple individual entity. Elementary particles, e.g. electrons, are entities localized in space each carrying its very own 'portion' of energy.
- (1b) Properties of physical systems, e.g. polarization of a photon, are described by quantities each taking a single definite value. Observation of physical quantities made in different order, eg. $x \to p$ vs $p \to x$, gives exactly the same value as a result. The probability of observing an object tunneling through a potential barrier has a specific value equal 0.0. A quantity representing a measure of the spacetime curvature has a specific value equal 0.0. A quantity measuring the size of the physical space has a specific fixed value. The length of an interval of time between two events has exactly the same value for observers in relative motion.
- (2a) Objects, e.g. photons, considered as being space-like separated must be distinct independent systems. Light ray is a wave of energy spread out over distinct points of space.
- (2b) Distinguishable distinct values will describe the corresponding quantities representing certain properties, e.g. energy, of systems considered arbitrarily similar (in relevant respects) to each other.

In each of these cases it has eventually turned out, as could have been expected as per our method, that, in fact, it is not really so[1][2].

Now, based on these examples, we will clarify certain aspects of the proposed method, related especially to the question of exactly what sort of conclusions can be drawn when using it, addressing some possible objections to its validity and applicability:

- One could surely give an abundance of putative counterexamples and use them as an evidence that our method, in fact, does not work. We would respond to this with a prediction saying that the method will work in all conceivable situations with no exceptions, and a suggestion that cases where it seems like it fails (i.e. has not yet worked) are due to (a) a limited precision of measurement[4][6] and/or (b) a lack of relevant empirical observations or a misinterpretation of the existing ones (that is, resulting from seeing still some separate points perhaps by disregarding what is considered a broader context or irrelevant details–taking Wigner's friend as being separate from Wigner, so to say)[2].

- One might wonder how the 'generic' predictions in such examples, as generated by our method (through an essentially '*a priori*' reasoning), relate to the established specific causes and explanations of the corresponding phenomena. For instance, the length of corresponding time intervals between two events being not in principle equal for different observers is explained technically as a consequence of the invariance of the laws of physics (resulting in particular in the constancy of the speed of light) as assessed in different reference frames in motion relative to each other. We would respond to this that (a) the specific phenomena, accompanied by the occurrence of different values of physical quantities (e.g. representing what is considered the length of some time interval), will be governed by specific laws and so will always have some specific particular explanation, but (b) those explanations will effectively always eventually agree with the general, generic prediction as dictated by an application of our method[3].
- Can the initial assertions (i.e. the ones to be eventually negated, according to our method) as made in examples from the two categories, (1) and (2) respectively, be seen as exact opposites of each other, at least when there seem to be 'counterparts' in both categories, referring apparently to the same physical phenomenon? And does applying the rule to one of such 'counterparts', from one of the two categories, (1) or (2), negating its respective assumption, lead to the conclusion that one must accept instead the 'corresponding' assertion from the other, 'opposite' category, that is (2) or (1), respectively? In other words, is being two (or more) distinct points the necessary consequence of not being one and the same point (and vice versa)? For instance, taking the example of what we consider "light", when it turns out that it is not really distributed wave-like, does it mean then that it must be a localized particle? And, perhaps in other circumstances, when it turns out that it is not really localized particle-like, does it mean then that it must be a distributed wave? As to this point, we conclude that, for us, the answer is in the negative. In this sense thus "light" is (in any circumstances) neither a localized particle nor distributed wave. The reason for this is simply that the assumption as made in each category is, based on our main postulate, something which can only be negated, and we consider both of the categories to be aspects of what we call the SF. For this reason also we can not speak of strict 'counterparts' or correspondences between the phenomena as described putatively by the examples in the two categories (as they do not provide any 'link', do not 'redirect', to each other), but at most, in a certain sense, only apparent, or 'approximate', ones. However specifically to the question of what can

doi.org/10.32388/1OSESK

be said about the phenomena in some positive terms, based on our postulate, besides such a negation, we will return in the last Sec. 6.

- Relatedly to the previous point, for some particular examples of type (1) or (2), for which anything that could be seen as an analogue, a ’counterpart’, that would qualify for the ’opposite’ category, (2) or (1) respectively, has not arguably thus far been observed, could we predict that it eventually, at least in principle, should? For instance, as an apparent counterpart for the example in which the quantity representing a measure of the spacetime curvature has turned out to not really be described by a specific fixed value, we could conceive of a situation, say, of some putative spacetime regions being arbitrarily similar to each other (in relevant respects) for which we would assume that the given quantity (i.e. corresponding to the one appearing in the other ’counterpart’ situation) will be properly described by distinguishable distinct values, and by using our method conclude that it should turn out that it is, in fact, not really so. To the extent that such apparently corresponding phenomena can be expected to be observed at all, our method suggests that one can indeed expect that.

5.2. Conceptual examples

In this section we consider some other examples of the (possible) application of our method, related with different types of specific objects or variables (more or less abstract). Let us start with a (lengthy) list, formulating explicitly (in a rather random order) some assertions (of type (1) or (2) or composite and in particular mixed ones, which our method does also admit, and now we do not care anymore about their respective sub-categories), in their content arguably at least in some way resembling some of the common assumptions as being made, in different physical contexts, by various actual models or theories (with some of them related, or dependent, while others to be seen perhaps as directly competing against each other):

a. Moment of time is described by a parameter t having a specific value.
b. There are many distinct moments of time, described by the parameter t taking distinct values (e.g. t_{-1}, t_0, t_1).
c. Any moment of time is a set of distinct events said to occur at this moment.
d. Any moment of time is a specific event said to occur at this moment.
e. Events that occur are described by different quantities each having a specific value.
f. Set of events constituting a moment of time is the same according to observers in relative motion.
g. Order in which any two events occur is the same according to different observers.

doi.org/10.32388/1OSESK

h. Spacetime is an object composed of distinct events which are said to exist in this object.
i. Regardless of how it is assessed each event in spacetime is described by a specific set of quantities each having a specific value.
j. Future is a specific object being a set of moments of time.
k. Past is a specific object being a set of moments of time.
l. Physical systems located in space at a given moment of time are distinct entities.
m. Any two events occur in a specific order, described by a variable denoting possible such orders having a specific value.
n. Measurement of a physical quantity occurs at a single moment of time, described by the parameter t having a specific value.
o. The process of measurement of a physical quantity occurs over many distinct moments of time, with the corresponding parameter t taking distinct values.
p. Measurement outcome is a value selected from a specific set of distinct possible results.
q. Any two observed events, e.g. outcomes of measurements, occur within one and the same object called spacetime.
r. Different observed events (e.g. observed by different observers) occur in distinct objects called spacetimes.
s. Observer system, e.g. a measuring apparatus, and systems observed (including such being themselves observers of yet another systems thus observed) are distinct entities.
t. The quantity representing the number of spacetime dimensions is described by a specific value.
u. Physical interaction entails two, or more, distinct systems (between which the "action" occurs).
v. Physical interaction is a single entity (e.g. one event, or one process).

Now, we apply our method to these points, in the usual way, that is by saying that in each case it should turn out that the actual phenomena being thus described are not really so (and for some of them it seems like it indeed already did, but we leave it to the reader to guess which ones, as our goals in this section are somewhat different than in the previous one). Then, what we would like to do here is to suggest that selecting some of the specific points from the above pool, taken in a 'negated' form as resulting from the application of the method, possibly in some combinations, might lead one straight to certain general concepts closely resembling some actually considered in the literature, in particular as potential solutions to different problems related to some actual observations or thought experiments. In each case, however, this similarity or overlap can be at most a partial one, primarily because some of those concepts (or more

 doi.org/10.32388/1OSESK

basic notions on which they are based) do not have a one established definition which one could strive to satisfy strictly in the first place, and being limited precisely by the extent to which they can be taken in a correspondingly ’negative’ form. Nonetheless, below we will point at some of such concepts, for each of them (I) indicating some (combinations) of the above-listed points from which it could derive, (II) describing it briefly as it appears in the literature, focusing on specific problems to which it is related (and, if it will seem necessary, giving some additional justification for its very appearance on this list), and (III) specifying difficulties which might arise for models or theories in which it appears in some form as a result of retaining some traces of SF (in particular in a specific form of some of the other assumptions as listed above):

- *Relativity of simultaneity* (I) (f). (II) While a related concept appearing under this name as a basic conclusion of the relativity theory posits that simultaneity is relative, rather than ’absolute’, we consider it here in a purely ’negative’ form, namely as expressing a *non-absoluteness* of simultaneity, or more precisely yet, as a thesis saying that there is in fact no absolute simultaneity and, moreover, one should not speak of any simultaneity (absolute, relative, or otherwise) in the first place, if construed as a moment of time being a set of distinct events, as this would clearly amount to (III) our very assumption (c), constituting thus a trace of SF, which in turn might lead, after some possible reasoning[9], to a view called "block universe" (a conclusion which perhaps could be avoided by taking (d) instead of (c), however itself a move with rather questionable benefits), which could also be recognized on our list as assumption (h), and which, in conjunction with some further assumptions like (i), seems especially problematic, likely to pose difficulties for reconciliation of the concept considered here with certain others, like some of the ones discussed below.
- *Open future* (I) Perhaps (i), or (j) with (e). (II) Concept inspired in particular by quantum theory according to which the outcomes of measurements yet to be performed of, at least some, physical systems’ properties are not described by a specific value, concluding that, therefore, such future events, relative to the time of measurement, are not pre-determined and so the future is in this sense not ’fixed’ (or ’closed’), which (III) if taken within SF, could pose a problem for reconciliation or actually appear to be in a direct conflict, due in particular to the very main assumption that is to be negated here, with the notion of "block universe" as resulting supposedly from the concept of *Relativity of simultaneity* (as described above)[10], and besides, should be expected to entail conceptual difficulties such as the questions e.g., among others, whether it suffices that a single future event is not determined for the (whole) future being in itself not determined, or whether there can be any

doi.org/10.32388/1OSESK

future events which would be in fact determined (as could be suggested by the probability of their occurrence being described by a specific value equal 1.0)[11], which could be seen as direct manifestations or consequences of some of our other assumptions having been made (like (c) and (l), (p), usually (a) and (b), but also (n) or (o)).

- *Retrocausality* (I) Identifying "causality" with an actual physical 'influence' or interaction of some sort, it could be (a) and (b), or (m), supplemented perhaps by (u) and/or (v). (II) Posits that possible influence of events as exerted on other events is not limited to ones located in what is considered their respective future, with such influences traveling also in some way backward in time, which could happen locally (being an 'action-by-contact', or 'continuous action'; and which could potentially provide a 'local' explanation for the correlations as observed between space-like separated events, through some mechanism involving such interactions "zigzagging" through spacetime) or non-locally, a concept which might pertain also, in particular, to path integral-based approaches where under such an interpretation a final state could somehow directly (i.e. physically) influence the preceding course of events[12][13], but (III) if considered in terms as allowed within the SF, it faces some rather obvious, and serious, conceptual problems.
- *Open past* (I) Perhaps (i), or (e) with (k). (II) Motivated by different lines of argumentation, for instance: by conjunction of some form of *Open future* combined with assumptions about the time-symmetry of relevant laws of physics; seen as a consequence of some form of *Retrocausality*; or derived from considerations about storage and retention of information, modeled e.g. as a process in which past events, whose relation to present ones becomes indeterminate, would in some sense 'cease to be'[14][15]; but (III) to the extent that such concept is often treated in particular as analogous (or 'symmetric') to *Open future*, it can be expected to be plagued by correspondingly analogous or 'symmetric' traces of SF.
- *Non-absoluteness of observed events* (I) Perhaps (q), maybe with (t). (II) As entertained in the literature it stems in particular from considerations of the "Wigner's friend" type of scenarios according to which the accounts of the actual state of what is considered the same physical system, as given by different observers, with both of them following the prescriptions of quantum mechanics, can be effectively incompatible with each other, and suggests that in order to prevent such conflicts one could posit that observed events, i.e. outcomes of measurements as performed by an individual 'apparatus', are in some sense not (or at least not fully) 'public', or 'exposed', to other potential observers of a given system, but rather 'private', specifically, for instance, relational, or perspectival[11][16][17][18][19][20], a

view which (III) if contaminated with traces of SF, like (s), (e), or (r), might lead in particular to theoretical difficulties with establishing 'links' allowing to find correspondences (or maps) between different such perspectives, the lack of which could imply a total subjectivity (and thus 'solipsism') of the accounts of (any) observed physical phenomena.

The reader will certainly be able to supplement the lists in this and the previous section with yet another, numerous examples of choice. As some additional illustration, giving a flavour of the sort of conceptual problems or difficulties as faced by different models or theories that can be expected based on our perspective (and which most likely can be resolved using some other notions based on the SF leading however to yet another such a problems down the road), in particular such giving empirically clearly inadequate predictions, one could mention, for instance: the problem of electron "self-repulsion", with the electron modeled as a 'cloud' of charge distributed at distinct points in space, with its different parts consequently repelling one another in such a model; or problems with establishing theoretically an actual number of particles when they are considered as localized entities[21].

6. The alternative

The examples as given above should have demonstrated by now, directly or indirectly, that the proposed method might actually work, giving thus a support to our main proposition from which it derives (Sect. 2). However since it allows only negative determinations (a property of a system being described by neither one specific value nor many distinct values, an electron being neither a particle nor wave, etc), saying how things are not, one wonders what they might actually be, and what might be the alternative to the descriptions as allowed within the SF based on separate points. Perhaps, in order to address such question, we would need first to supplement our main postulate with one basic, and admittedly rather vague, assumption, namely saying something along the lines of: the physical phenomena seem to happen in some very concrete way, such that can be to some extent effectively approximated with descriptions based on the notion of separate points. We should, therefore, look for some general notion to which the SF would be a some sort of 'approximation'. To anticipate the conclusions here, the result of our analysis is that what we can quite confidently say for now is not much more than that the sought-after notion is something that is a 'non'-SF. We can, nevertheless, think of at least two (but not necessarily unrelated and independent) tentative options, or routes, by which we could potentially arrive at some definite mathematical notion and perhaps actually construct (an example of) the non-SF, which we might call, respectively:

doi.org/10.32388/1OSESK

- *Graded* This option suggests to adopt (and most likely somehow adapt) a sort of ’graded’ language and notions. Namely, while finding, in reference to some phenomena, an assumption being made of one of our two types, that is, either that they are like a one and the same point or that they are like two (or more) distinct points, we must conclude in any such case that in fact the given phenomena are not really so, we could say instead that they are so, in a certain sense, to some ’degree’, or ’a little bit’. In what sense exactly? A similar language, and possibly also a desired sense, appears in particular in the interpretation of probabilities, as appearing in models of physical phenomena, as propensities (understood as a sort of graded causal influences), described also as potentialities, or tendencies (of certain events, or outcomes of measurement, to obtain), with the related phenomena being described in certain contexts as ’unsharp’, and modeled using fuzzy notions[4][22]. While this might seem like leading in at least one of the possible directions we are perhaps looking for (describing in some constructive way the phenomena which would be neither exactly the same nor not the same), we note that the ’strength’ (or ’weakness’) of such putative ’tendencies’ is typically described itself by using what can be considered separate points (retaining thus traces of SF), which might be particularly misleading.

- *Change* This option derives from the view that while what is commonly understood by "change" might be framed, within the SF, as involving some distinct points and a singular process of their juxtaposition, with such a connection (of, on the one hand, the difference between the points being distinct, and on the other, their bringing together) resulting in a sort of ’contrast’ (or ’tension’), it would be more adequately described by taking this process as being something that is not entirely different from the points themselves. What it therefore suggests is to consider an ’actual’ change, in which there would be no singular process and no distinct points, but only some form of a ’contrast’, or ’tension’, alone. How could one conceptualize this more precisely? It so happens that what is referred to as "change" in physics is often posited to be closely related, or sometimes even identified, with the notion called "time". Then, especially to the extent that the understanding of time depends on particular mathematical language and notions as employed by physics[23], we surmise that perhaps an inspiration for advancements along this route might be found in some of the conceptions about time, but also the other way round, namely that potential developments of this option (but most likely in some conjunction with the above one) should contribute to some clarification of the various problems related to the (many) phenomena that go under the name of "time"[24][25][26][27][28], addressing in particular the opinions saying that the actual phenomenon of (a ’flowing’) time, being arguably in some sense inherently complex ("rich"), is, at least currently, beyond the conceptual scope and reach of physics[29].

Taken together, it might seem intuitively that such two routes, or their combination (or rather a fusion), would lead to a notion expressing a some sort of inherent 'indefiniteness' (and perhaps 'messiness'), but also, in a sense (and maybe somewhat paradoxically), a stronger 'continuity' and more 'controllable' influences within the physical phenomena (as opposed e.g. to a popular picture of 'discontinuity', being presented as a consequence of what the quantum theory suggests, with its alleged discrete "jumps" and "randomness"), but exactly how best to approach it we leave it here as an open problem.

Finally, let us mention that some of such possible options or avenues, in particular *Change* but perhaps also the *Graded* one, as was argued also in[7][8], might actually be suggested, or inspired, by an analysis of what one might call our 'direct' experience of the world. While it is indeed unclear how or what exactly it is that we directly experience (as evidenced by the vast psychological and philosophical literature and in particular suggestions that many if not most of our innocent conceptions about it, which one could consider obvious and uncontroversial, might actually turn out to be 'illusions' of some sort) and how best to describe it mathematically, the approach of a total (and rather *a priori*) disregard for the potential evidence that it could offer, in the context of interest to us here, would be rather ill-advised (since after all, obviously, we arrive at, and verify, any theoretical hypotheses in physics through the empirical observations which we obtain inevitably, at least 'filtered', through our 'phenomenal' experience)[30]. Therefore, the postulated non-SF should perhaps allow also to describe, or at least should not be in conflict with, such direct experience (whatever it is) in itself, and as a step in such direction let us describe now a one last application of our method, leading arguably to conclusions agreeing with our intuition, this time in two examples concerning our perception of things in what is typically considered, respectively, physical:

- "space". When I look at, say, the moon, if one assumed that the moon and my percept of the moon are two distinct 'things', i.e. on the one hand the moon as a lump of light-reflecting rocks being 'out there' in the sky and on the other my percept of this moon as a (say) wave of ions flowing 'here' in my head, we must conclude as per our method that the actual phenomena under consideration are not really so. If one assumed instead that the moon and my percept of the moon are a one 'thing' (which would be either strictly out there in the sky as the moon or here in my head as the ion wave), we would similarly conclude that they are not really so. What, however, one can do, is to go one of our suggested routes, and for instance use the language of the *Graded* option and say, in each case, that the phenomena are ’a little bit’ so (i.e. a one and the same thing or two distinct things), and so my percept of the moon is a little bit here in my head and a little bit (and so quite literally) out there in the sky as the said lump of rocks itself. And this could be the underlying reason for (or at least contribute to, somehow, but perhaps even more so when combined somehow with suggestions of the *Change* option) a direct experience of the ’extension’ of (i.e. the ’distance’ between objects in) what we usually consider as "space".

- "time". When I experience what I consider a memory of some event, say, my visit to a dentist last month, if one assumed that the visit being remembered and my experience of remembering the visit are two distinct ’things’, i.e. on the one hand the visit as an event happening ’in the past’ in the dentist room and on the other my recollection of this visit as (say) a wave of ions flowing ’now’ in my head, we must obviously conclude that the actual phenomena under consideration are not really so. If one assumed instead that the visit and my recollection of it are a one ’thing’ (which would be either strictly in the past as the event of me sitting in the dentist room or now as the ion wave), we would again conclude that they are not really so. One can however use a strategy like in the example above and using the ’graded’ language say that my experience of remembering the visit is a little bit now in my head and a little bit in the past at the actual visit in the dentist room (and so in this sense it means that my experience, quite literally, ’moves back in time’). And this could be the reason (similarly like in the example above) for a direct experience of the ’extension’ of (i.e. the ’distance’ between the events in) what we usually consider as "time".

7. Conclusion

We proposed here a methodological principle which can be applied automatically (’mindlessly’) in different situations and, we posit, it should always lead to correct results. And if it indeed does, then, let us note as one final remark before closing, it might pose a curious challenge for the view on mathematics known as constructivism (and in particular intuitionism), which posits that only such mathematical objects that can in principle be (or actually were) in some way explicitly constructed can be said to exist. For we could claim that: (a) (based on its effectiveness) the mathematical object we call the "non-SF" must in some (a rather concrete) sense ’exist’, but (b) (due to the nature of what is being demanded from it, and despite our tentative attempts at devising some possible routes towards it) it simply cannot be in any meaningful way explicitly constructed. And this situation, in which something does (in some sense)

doi.org/10.32388/1OSESK

exist but cannot be explicitly constructed, taken literally, would seem to constitute a counterexample against such view.

Statements and Declarations

Funding

No funding was received for conducting this study.

Conflicts of Interest

The author has no relevant financial or non-financial interests to disclose.

Data Availability

No datasets were generated or analysed during the current study.

Author Contributions

B.J. wrote the paper.

Footnotes

[1] Which, assuming (ideally) a continued progress of empirical research, should eventually, sooner or later, manifest itself in some actual observations.

[2] To put it plainly, whenever one wants to find in the actual phenomena some separate points, he will always succeed in making himself believe that he does indeed see some.

[3] On a side note, one of predictions of the method must be that the constancy of the speed of light, just as any other strict 'constancy', can be only apparent (that is, 'approximate'; somewhat reminding thus what is hypothesized in different variable-constants theories).

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Declarations

Funding: No specific funding was received for this work.

Potential competing interests: No potential competing interests to declare.