-EN_52: Machine V: relations, measurement and comparison without altering the proposal

Main document of project EN_52

By Víctor Estrada Díaz · Einstein–VED · EN_52

I present a research proposal: to study a deterministic machine V, buildable with conventional electronics or software, and compare its behavior with a quantum machine Q through explicit operations and protocols.

The starting point is to study each machine according to its definition. We cannot add operations, mechanisms or requirements to V that are not part of its design and then evaluate that modification as if it were the original proposal.

1. Known relations between unknown values

An inverter establishes:

$B = 1 - A$

We can know this relation without knowing A or B. The component has defined behavior and operates without our having to observe its input.

Not knowing a state does not mean that the state does not exist. Nor does it turn the lack of knowledge into an additional physical mechanism.

My proposal consists in constructing and transforming relations between values that remain unknown to us until readout. V is not defined as a simulation of a register of quantum amplitudes, nor does it require, by definition, storing 2^n amplitudes.

The inverter illustrates this principle. To establish the computational scope of V, the complete machines, their operations and the results obtained must be examined.

2. Evolution and knowledge: the role of f(t)

In Einstein–VED, f is an internal function of 3S+T spacetime: it describes states in spacetime itself. The notation f(t) considers its temporal dependence in the context studied; it does not introduce a time external to the system.

My document ES_2 distinguishes the existence of f for all $t \in T$ from the internal perspective situated at t_0: the causal past determines the state, while the future is not accessible as knowledge from that temporal position. Defined does not mean known. This distinction underpins the use of f in explaining the prior lack of knowledge and measurement in V.

Measurement at t_0 records the result of that execution; it does not create the internal function f through the mere act of knowing. In this approach, collapse designates the transition from lack of knowledge to knowledge of the result.

The definition and its development can be found in ES_2: Determinism, Indeterminacy and Free Will, section 2 and in ES_0: Einstein–VED, section 2, both accessible from my UNIHOLOG catalogue.

We take t_0 as the instant at which we perform the measurement. The readout records a result:

$b = M_v(t_0) \in \{0, 1\}$

We can represent our knowledge of that readout by:

Before measurement: $K_\beta(V) = \xi$.

After measurement: $K_\beta(V) = b$.

Here K_β represents our knowledge of the result of that execution. ξ expresses lack of knowledge; it is not a third physical state stored in V.

The record reports what was read at t_0. It does not imply automatically knowing the entire previous or subsequent evolution of the system.

3. Collapse in this approach

In V, I call collapse the passage from lack of knowledge to knowledge of the result through its readout and recording.

Measurement observes what is there at to. It is not necessary to attribute physical existence to the lack of knowledge or to suppose that the act of knowing retrospectively creates the observed state.

This is my interpretation of collapse within the Einstein–VED framework. The correspondence with the quantum description must be studied through the operations and results of each protocol; the interpretation, by itself, does not demonstrate equivalence.

4. Studying V without introducing extraneous mechanisms

The proposed construction uses conventional components with defined behavior. I do not postulate additional physical mechanisms to explain why the observer does not know their internal values.

However, it is useful to distinguish that meaning of “hidden mechanism” from the technical use of “hidden variable” in physics. A parameter representing an internal state that determines the responses can play that mathematical role. Classification requires showing how it corresponds to the real architecture; applying a label is not enough.

Prior lack of knowledge does not by itself demonstrate either quantum equivalence or the inapplicability of a theorem. What is decisive is the concrete structure of the machine and the experiment.

5. Why CHSH does not apply to the protocol presented here

The readout protocol described here does not include alternative measurement settings. It includes a defined readout at t_0:

$b = M_v(t_0)$

The CHSH test requires correlations corresponding to alternative choices of settings in two branches of the experiment. Those operations are not defined in this V protocol.

Introducing responses A_0, A_1, B_0 and B_1 as if they were operations available in this machine adds an experimental structure that has not been proposed.

Therefore, CHSH does not apply to this single-readout protocol. It is not appropriate to use that inequality to invalidate the operation of the inverter or the principle of operating with relations between unknown values.

The reason is the absence of the required experimental structure. It is not necessary to maintain that Bell is excluded because V is deterministic or because we interpret probability as lack of knowledge.

If another realization of V were built with alternative settings and a correlation protocol, its specific conditions would have to be analyzed. That would be a different test and should be identified as such.

6. A symmetric criterion for Q and V

The comparison must define the operations available to both machines, the preparation conditions, the transformations and the readout.

It is not appropriate to require V to know all its internal values in advance if that requirement is not imposed on Q in the same test. Nor is it appropriate to attribute quantum properties to V solely because its results are unknown before measurement.

Both must be subjected to comparable criteria of precision, repeatability and resources. The connections, communications, times and result-selection criteria needed to interpret the test must also be documented.

If Q and V perform the same task under the agreed protocol and meet the established criterion, the result establishes operational equivalence for that task and those conditions. Extending it to other operations requires new tests.

7. What I propose to present and study

I propose documenting the Q_1/V_1, Q_2/V_2 and Q_3/V_3 pairs through explicit correspondences, reproducible protocols and recorded results.

My machine V must be distinguished from V_ref and from any variant used as a reference. Each result must indicate which implementation was tested.

The research must examine the relations, temporal evolution and measurements that each machine actually defines. Objections must refer to those operations, and conclusions must be limited to the scope of the tests performed.

My proposal is to study V without altering its construction and to compare Q and V using explicit and symmetric criteria. Not knowing a value does not deny its existence; knowing a relation allows operation without necessarily knowing its individual values.

— Víctor Estrada Díaz Einstein–VED · EN_52 ORCID: 0000-0001-9942-1021

Reference on the scope of Bell

J. S. Bell (1964), “On the Einstein Podolsky Rosen paradox”, Physics Physique Fizika 1, 195–200.
https://doi.org/10.1103/PhysicsPhysiqueFizika.1.195

Context: my explanation of entanglement

In my documents I also address entanglement from a perspective different from the conventional one. In Einstein–VED I relate this explanation to the common origin (t0, s0) and to the limits of the differentials of the observed:

$dt' \to 0$ y $ds' \to 0$

$(t_0 + dt', s_0 + ds') \to (t_0, s_0)$

This explanation does not assert that space and time disappear or attribute rest to the particles. I distinguish the relation ds/dt = c from the quotient ds′/dt′, which has the indeterminate form 0/0 in the indicated limit.

I refer readers to the development in my documents for the argument and its foundations. I include it here as conceptual context for my proposal; the operational Q–V comparison is carried out through the concrete protocols described in this article.

See Deterministic Explanation of Entanglement, ES_0: Einstein–VED and the Einstein–VED / UNIHOLOG collection on Zenodo. The works are also available from my catalogue.

Author's documents: entanglement and the Einstein–VED framework

For my explanation of entanglement and the geometric and temporal context of this proposal, I refer readers to the following works of my own. They are cited as developments of my framework, not as independent verification of Q–V equivalence.

1. Víctor Estrada Díaz, **Deterministic Explanation of Entanglement**. Specific document included in the author's catalogue. Consult document. Alternative access from the catalogue.

2. Víctor Estrada Díaz, **ES_0: EINSTEIN–VED – The Deterministic Framework That Completes Einstein's Program**. General presentation of the framework; includes the

function f, the distinction between reality and knowledge, and the geometric interpretation of entanglement. Consult document.

3. **Einstein–VED / UNIHOLOG collection on Zenodo**, Víctor Estrada Díaz. Reference for the documentary collection, not an individual DOI assigned to each of the preceding texts. DOI: 10.5281/zenodo.17172925.

Catalogue of works: https://estradad.es/catalogo.php?idioma=ES

Author's website: https://estradad.es

Specific reference for the internal function f

Víctor Estrada Díaz, **ES_2: Einstein–VED: Determinism, Indeterminacy and Free Will**, section 2, “Function f: Definition, Causality and Determination”, especially 2.3, “Extension of f to All of Spacetime”.

Document ES_2 · UNIHOLOG catalogue · General catalogue.