

7.2. For inspiration to further work

We choose the propagation *direction* to $\gamma_3 \equiv \sigma_3 \gamma_0$, and define the *null basis* $\{n, \bar{n}\}$ *directions* from (5.310) as

$$(7.71) \quad n := \sqrt{1/2}(\gamma_0 + \gamma_3), \quad \text{and} \quad \bar{n} := \sqrt{1/2}(\gamma_0 - \gamma_3),$$

with the nilpotent spectral basis properties

$$(7.72) \quad n^2 = \bar{n}^2 = 0, \quad \text{and} \quad \bar{n} \cdot n = n \cdot \bar{n} = 1, \quad (\text{with } \textit{perpendicular} \text{ display } \bar{n} \perp n).$$

We then have the Minkowski \mathcal{B} -plane bivector

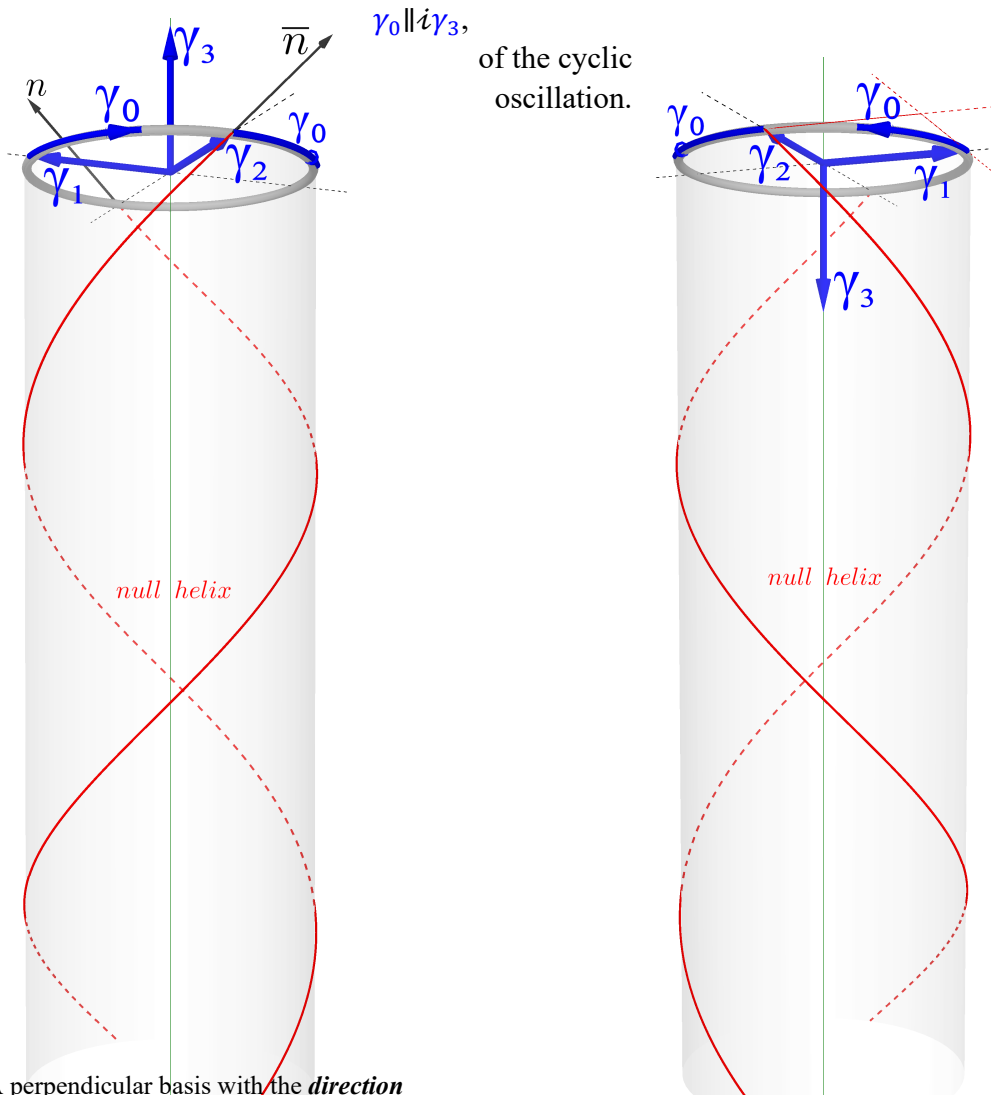
$$(7.73) \quad n \wedge \bar{n} = \mathcal{B}_3 := \gamma_3 \gamma_0 = \gamma_3 \wedge \gamma_0.$$

Then the STA basis $\{\gamma_0, \gamma_1, \gamma_2, \gamma_3\}$ that fulfil (7.3) is *orthonormal* $\gamma_\mu \cdot \gamma_\nu = \delta_{\mu,\nu}$, $\mu, \nu = 0, 1, 2, 3$ can be illustrated *perpendicular* for our intuition as follows for the chosen propagation:

Figure 7.1 the *direction* $\gamma_3 \equiv \sigma_3 \gamma_0$ is the propagation into the *FUTURE* towards a receiver.

Figure 7.2 the *direction* orientation of γ_3 is into the past emerging from a transmitting origin.

In the display $\gamma_0 \perp \gamma_3$ is all around a unit circle, and γ_0 intersects as a unit radian arc concept the other two basis vectors are perpendicular in display $\gamma_0 \perp \gamma_1$ and $\gamma_0 \perp \gamma_2$. We have the dual transversal plane concept $\gamma_1 \wedge \gamma_2 = \gamma_1 \gamma_2 = i \gamma_3$ parallel with the development *direction* display $\gamma_0 \parallel i \gamma_3$,



of the cyclic oscillation.

Figure 7.1 STA perpendicular basis with the *direction* $\gamma_3 \equiv \sigma_3 \gamma_0$ is the propagation into the *FUTURE*. The *null basis* $\{n, \bar{n}\}$ generate the *null helix* through the past.

Figure 7.2 STA basis with the *direction* orientation of γ_3 is into the past emerge from a transmitting origin.

7.3. Further Work on these Issues is Postponed

The ambition of this book has developed to give a foundation to an updated epistemology of the tools we can use to understand the a priori structure *qualities* of nature in our science of physics. The work in this volume has fulfilled a part and I have the idea to continue in an extra volume. This ambition is to get deeper into the possibilities to understand the relation of information exchange through space between all entities existing in Nature described by the scientific tools of physics. An example is that when we have an idea of measuring gravitation waves it is in all reasonable concepts the propagation of information about Descartes extension of space we try to measure, and the first question is how and why this extension arises for our intuition. The goal for the next volume is to understand the tradition of fields and expand our understanding of Nature through the geometric and mathematic tools we invent for ourselves to manage the system we build as the science we call physics. In the classic traditional philosophy, the separation of the scientific system from nature per se is called metaphysics. If you on top of this consider mathematics with its platonic idealistic laws as the master of all universal nature you are lost to a metaphysical causality philosophy and may be even a divined paraphysics.

7.3.1. The Foundation of Physics is Nature Itself

The founding philosophy, we follow in the work of this book, is that nature itself is the master and all human activity emerge from this Nature. The science of the fundamental understanding of Nature, we call physics. From ancient times we as humans have constructed geometrical and mathematical tools to describe structural models forming results that apparently agree with what we observe as Nature. All our research science we call physics is just a human technique that emerge from Nature itself, quite exactly as we humans ourselves, emerges from Nature. Using Immanuel Kant's idea of distinguishing what we can know about nature and Nature per se (Das Ding für uns und Das Ding an Sich)

7.3.1.1. Nature per se as a priori of Physics

We have a priori two concepts: Nature per se, contra Physics as our scientific practice. A priori we consider Nature as transcendental to our intuition knowledge in physics. In a mathematical language, we will call these two ideas orthogonal, but we cannot avoid presuming them to be interconnected to catch any possibility for making scientific knowledge. The reader has the opportunity to choose three dissimilar categories of philosophy for physics

- Ortho-physics with the idea of *primary quality directions* with *grades* in Nature,
- Meta-physics as the traditional classical and quantum mechanics govern by pure mathematics,
- Para-physics governed by religion through a divined instance.

Just let us call the endeavour of this book a founding science for: a priori of physics.