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| **Title:** |
| **Santilli's isotopic, genotopic and isodual four directions of time and nonequilibrium thermodynamics** |
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| **Abstract:** (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will ‘expand’ over 2 pages as you add text/diagrams into it.) |
| The decades of research by Professor R. M. Santilli saw the advent of iso- and isodual-; geno- and genoisodual- ; and hyper- and isodualhyper mathematics and corresponding lifting of mechanics including quantum mechanics [1,2]. This then removed a multitude of inadequacies existing in various branches of science e.g. general and special relativity, quantum mechanics, quantum chemistry, astrophysics, cosmology, particle physics, nuclear physics, and so on. Thus we can safely say that the new mathematics of Santilli produced new sciences for a new era. Santilli has discovered [3] for the first time that there are four directions of time's arrow and not the only two asserted earlier by Eddington [4]. This presentation is a brief review of Santilli's *isotimes, genotimes and genohypertimes* and their implications. To this list we have added *genothermodynamic time’s arrows* identified for the first time by the present author [5, 6, 7] by reanalyzing the genononequilibrium thermodynamics of coupled processes [8].  **References:**   1. R. M. Santilli, “Hadronic Mathematics, Mechanics and Chemistry. Vol. III: Iso-, Geno-, Hyper-Formulations for Matter and Their Isoduals for Antimatter”, International Academic Press, Palm Harbor, FL 34682, U.S.A., 2008. <http://www.i-b-r.org/docs/HMMC-III-02-26-08.pdf> 2. R. M. Santilli, “Elements of Iso-, Geno-, Hyper-Mathematics for Matter, Their Isoduals for Antimatter, and Their Applications in Physics, Chemistry, and Biology”, *Found. Phys.,* **33(9)**, 1373 – 1416 (2003). 3. R. M. Santilli, “Isotopic, Genotopic and Hyperstructural Method in Theoretical Biology”, Ukraine Academy of Sciences, Institute for Theoretical Physics, Naukova Dumka Publishers, 3 Tereshchenkivska Street, Kiev 4, 252601, Ukraine, 1997. <http://www.santilli-foundation.org/docs/santilli-67.pdf> 4. A. S. Eddington, “The Nature of the Physical World”, Cambridge University Press, Cambridge, 1931. 5. A. A. Bhalekar, “Studies of Santilli's isotopic, genotopic and isodual four directions of time”, AIP Proceedings of International Conference on Numerical Analysis and Applied Mathematics ICAANM-2013, American Institute of Physics Press, (In press).   <http://www.santilli-foundation.org/docs/TimeArrows-AAB-2.pdf>   1. A. A. Bhalekar, “Geno-Nonequilibrium Thermodynamics. {II}. Spatially Uniform, Spatially Non-uniform, Complex and Antimatter Systems, and Thermodynamic Time's Arrows”, *CACAA*, (2014) (In press). 2. A. A. Bhalekar, “Santilli's New Mathematics for Chemists and Biologists. An Introductory Account”, *CACAA*, (2013) (In press). <http://www.santilli-foundation.org/docs/Bhalekar-Math-2013.pdf> 3. S. R. De Groot and P. Mazur, “Non-Equilibrium Thermodynamics”, North-Holland, Amsterdam, 1962. |