

that defines the space-timbre is constructed. By this means a set of different definitions and results are proposed in order to achieve two main goals: a) develop a formal definition of the space-timbre with the dynamical systems foundations and b) create a unique and original mathematical representation of the space-timbre as a bridge between two realms, the electroacoustic music and the abstract mathematical language. In this sense this work contributes to the field of dynamical systems applied to music but with the novelty that it is focused to a new conception of musical parameter: the space-timbre.

Keywords: Dynamical Systems and Music, Systems Theory and Art, Electroacoustic Music and Math, Mathematical representations of Space and Timbre.

**The Universe multiphase meta-reduction: The Harmon
(Mandala), continuum (Prana), discretization,
formalization, knowledge, cognition, condensation and
Absolute Nothing**

Alexander V. Sosnitsky¹, Anatoly I. Shevchenko²

*¹Berdyansk State Pedagogical University, Berdyansk, Ukraine, ²Institute of AI
Problems of the MES and NAS of Ukraine, Kiev, Ukraine*

Universalization of the Universe concept allowed to deduce an alternative, more complete and consistent new cosmology, different from prevailing now the Big Bang hypothesis on the same factual basis. Obtained universal (chaotic / harmonic) cosmology is based on combinatorial-logical representations and fundamentally allows a qualitative derivation of universal properties in the framework of the axiomatic paradigm based on the hypothetical Universal Axiom (UA), the formulas of which are sufficiently substantiated. Intelligence is found to be the important universal concept immediately following from the UA that implements a conditioned reflex with a consistent concretization of hypotheses and minimizes the contradictions that arise. The only criterion of truth is exclusively the volume of the resulting hypothesis system, including facts. This gives rise to multivariance and hypothetical character knowledge of all kinds and justifies the applied research method, especially for conceptually remote areas such as cosmology. This research develops the above cosmology and substantiates a multiphase Universe, which consistently passes through different phase states with a reduction in

properties that allows effective cognition and harmonization up to achieving the target state of Harmon followed by complete self-destruction, in contrast to the prevailing theories of continuous development of the Universe. The study of phases opens up new important Universe's properties unknown to modern science, but well consistent with it. All the used meta-concepts are sufficiently formalized, however, it is difficult to understand in terms of our surrounding world, but fundamentally necessary for its existence. The meta-results obtained have the widest direct or indirect application, without which any serious research and development becomes incomplete and misunderstood.

Keywords: The Universe, Cosmology, Universal Theory, Universalization, Chaos, Harmony.

Comparison of Vortex Identification Methods for Corner Separation flow in a Compressor Cascade

Yumeng Tang¹, Yangwei Liu^{1,2}

¹National Key Laboratory of Science and Technology on Aero-Engine Aero-Thermodynamics, School of Energy and Power Engineering, Beihang University, Beijing, China, ² Collaborative Innovation Center of Advanced Aero-Engine, Beihang University, Beijing, China

The three-dimensional (3D) corner separation, which is an inherent flow structure within the compressors, has great effect on compressor performance, such as passage blockage, limiting static pressure rise, a considerable total pressure loss, reduction in compressor efficiency, and eventually stall and surge especially for highly loaded compressor. Hence, the flow mechanism should be further investigated. Vortex identification criterion is an important tool analyzing this kind of complex flow.

In the current study, the delayed detached eddy simulation (DDES) is firstly conducted in a highly loaded compressor cascade at the Mach number of 0.59. Then the different vortex identification methods, such as vorticity, pressure, $\tilde{\Delta}$, Q , $-\lambda_2$, λ_{ci}^2 , Ω , local trace criterion (LT_{cri}) and Liutex criteria have been used to analyze the 3D corner separation based on the DDES results. Detailed results for S1 and S3 stream surfaces are compared. The results show that different criterion has almost the same result when the vortex is concentrated and stable. However, they behave different as the corner separation becomes unstable. The Liutex criterion, which is directly related to fluid rigid rotation, can filter out the shear layer influence close to the wall. The vortex vector can also be used to show