

Editorial

Mathematics: The *S. cerevisiae* for Natural Science Research

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As the title suggests, the main aim of this special issue was to try to abridge, with mathematics aerobic yeast, the existing big gap between theoretical research and practical implementation in several disciplines. Here we can present six selected papers ranging from pure mathematics to applied *S. cerevisiae*. Four of the papers are concerned with pure mathematics.

“Lightlike hypersurfaces of a semi-Riemannian product manifold and quartersymmetric non-metric connections” by E. Kiliç and O. Bahadır [KB] is a topic in differential geometry and deals with degenerate submanifolds (degenerate or lightlike hypersurfaces) of a semi-Riemannian product manifold (M, g) , which is a differentiable manifold with a tensor field F whose square is I . A hypersurface (M, g) with the induced metric g degenerate is called a lightlike hypersurface. Screen semi-invariant and radical anti-invariant hypersurfaces are introduced and are suited together with quarter-symmetric nonmetric connection induced by the product structure.

This paper may be compared with S. A. O. A. Mahmoud “On some normality-like properties and Bishop’s property (β) for a class of operators on a Hilbert space”, whose topic belongs to functional analysis dealing with function spaces, both of them treat the structure of the fields in physical sense. Since normality of operators (corresponding to normality of matrices) rarely occurs, it is natural to generalize the notion to hyponormal and further generalization thereof; in [A] fundamental properties of bounded linear operators on a Hilbert space are studied including $[nQN]$ (n -power quasi normal), SVEP (single-valued extension property), and Bishop’s property (β) . The paper [SA] naturally shares some features with the paper

[L] in the H_1 -control aspect, where H_1 is the Hardy space. It is hoped that these pure-mathematical-looking papers will have further practical applications.

X.-H. Wang and Y.-L. Lu, "*The multiple gamma-functions and the log-gamma integrals*" is also of pure mathematics type paper which deals with Barnes double gamma-functions and give some new closed form for the integrals of the Euler gamma function, and so forth. This paper has some relevance to the paper of F.-H. Li [L] in the sense that both of them rely on the effective use of special functions. On the latter we dwell on below.

The paper of M. Fujio, "*A comparison of implications in orthomodular quantum logic—Morphological analysis of quantum logic*" reflects a modern trend of using computers and their implementations. The paper considers the semantics and QL (quantum logic) from mathematico-morphological point of view.

Regarding realization of applied *S. cerevisiae*, we had in mind two fields: life science and systems theory and somehow we were able to include two such papers. One is "Math-phys-chem approaches to life" by H. Kitajima and S. Kanemitsu, which provides a new seed bed (or seed crystals as the case may be) and includes several basic fields such as biology, physics, chemistry, and mathematics as well as applied disciplines such as molecular biology, thermodynamics, physics in the form of entropy, chemistry in the form of energy levels of molecular orbitals, and mathematics in the form of formal language theory and free groups.

The second topic-systems theory, which can have a wide range of practical applications and in which there are contained basic mathematics such as differential equations, complex analysis, and stability theory is treated in F. Li's paper [L] "*Control systems and number theory*". In the paper closer analysis has been made on the chain scattering representation of linear systems. Especially, the cascade connection (concatenation) of two plants represented in scattering representation amounts to the product of linear fractional transformation of matrices. It is also made clear the meaning of the L_p -norm of the (closed-loop) transfer functions in comparison with the mean values of the corresponding zeta-functions and the meaning of fractional order PID control in the context of the Riemann-Liouville transformation, which naturally leads to special functions.

Thus, in a sense, M. Fujio, H. Kitajima and S. Kanemitsu, F. Li have a common feature of describing the concatenation rules of two very remote-looking elements in a certain digitalized (number-theoretic) world. With the help of rigid structures furnished by S. A. O. A. Mahmoud, E. Kılıç and O. Bahadır and of special-function theoretic view point F. Li, X.-H. Wang and Y.-L. Lu, further research may be done in the direction shown in this special issue.

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