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Special Issue of Symmetry: "Integral Transformations, Operational Calculus and Their Applications"

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Editorial

Special Issue of Symmetry: “Integral Transformations, Operational Calculus and Their Applications”

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This Special Issue consists of a total of 14 accepted submissions (including several invited feature articles) to the Special Issue of the MDPI’s journal, *Symmetry* on the general subject-area of “Integral Transformations, Operational Calculus and Their Applications” from different parts of the world.

The present Special Issue contains the invited, accepted and published submissions (see [1–14]) to a Special Issue of the MDPI’s journal, *Symmetry*, on the remarkably wide subject-area of “Integral Transformations, Operational Calculus and Their Applications”. Many successful predecessors of this Special Issue happen to be the Special Issues of the MDPI’s journal, *Axioms*, on the subject-areas of “*q*-Series and Related Topics in Special Functions and Analytic Number Theory”, “Mathematical Analysis and Applications” and “Mathematical Analysis and Applications II”, the Special Issues of *Mathematics*, on the subject-areas of “Recent Advances in Fractional Calculus and Its Applications”, “Recent Developments in the Theory and Applications of Fractional Calculus”, “Operators of Fractional Calculus and Their Applications” and “Fractional-Order Integral and Derivative Operators and Their Applications”, and indeed also the Special Issue of *Symmetry* itself, on the subject-area of “Integral Transforms and Operational Calculus”. In fact, encouraged by the noteworthy successes of this series of Special Issues, as well as of (for example) the two Special Issues of *Axioms*, on the subject-areas of “Mathematical Analysis and Applications” and “Mathematical Analysis and Applications II”, *Axioms* has already started the publication of a Topical Collection, entitled “Mathematical Analysis and Applications” (Collection Editor: H. M. Srivastava), with an open submission deadline. The interested reader should refer to and read the book format of many of these Special Issues (Guest Editor: H. M. Srivastava), which are cited below (see [15–18]).

In recent years, various families of fractional-order integral and derivative operators, such as those named after Riemann-Liouville, Weyl, Hadamard, Grünwald-Letnikov, Riesz, Erdélyi-Kober, Liouville-Caputo and so on, have been found to be remarkably important and fruitful, due mainly to their demonstrated applications in numerous seemingly diverse and widespread areas of the mathematical, physical, chemical, engineering and statistical sciences. Many of these fractional-order operators provide interesting and potentially useful tools for solving ordinary and partial differential equations, as well as integral, differintegral and integro-differential equations; fractional-calculus analogues and extensions of each of these equations; and various other problems involving special functions of mathematical physics and applied mathematics, as well as their extensions and generalizations in one or more variables (see, for details, a widely- and extensively-cited monograph [19]).

As it is known fairly well, investigations involving the theory and applications of integral transformations and operational calculus are remarkably wide-spread in many diverse areas of the mathematical, physical, chemical, engineering and statistical sciences. In this Special Issue,

we invited and welcome review, expository and original research articles dealing with the recent state-of-the-art advances on the topics of integral transformations and operational calculus as well as their multidisciplinary applications, together with some relevance to the aspect of symmetry.

The suggested topics of interest for the call of papers for this Special Issue included, but were not limited to, the following keywords:

- Integral Transformations and Integral Equations as well as Other Related Operators Including Their Symmetry Properties and Characteristics
- Applications Involving Mathematical (or Higher Transcendental) Functions Including Their Symmetry Properties and Characteristics
- Applications Involving Fractional-Order Differential and Differintegral Equations and Their Associated Symmetry
- Applications Involving Symmetrical Aspect of Geometric Function Theory of Complex Analysis
- Applications Involving q -Series and q -Polynomials and Their Associated Symmetry
- Applications Involving Special Functions of Mathematical Physics and Applied Mathematics and Their Symmetrical Aspect
- Applications Involving Analytic Number Theory and Symmetry

Several well-established scientific research journals, which are published by such publishers as (for example) Elsevier Science Publishers, John Wiley and Sons, Hindawi Publishing Corporation, Springer, De Gruyter, MDPI and other publishing houses, have published and continue to publish a number of Special Issues of many of their journals on recent advances on different aspects, especially of the subject of one of the above-mentioned keywords, “Applications Involving Fractional-Order Differential and Differintegral Equations”. Many widely-attended international conferences, too, continue to be successfully organized and held world-wide ever since the very first one on this particular subject-area in U.S.A. in the year 1974. In this connection, it seems to be worthwhile to refer the interested readers of this Special Issue to a recently-published survey-cum-expository review article (see [20]) which presented a brief elementary and introductory overview of the theory of the integral and derivative operators of fractional calculus and their applications especially in developing solutions of certain interesting families of ordinary and partial fractional “differintegral” equations. Furthermore, in connection with such works as (for example) [4,7], and indeed also many papers included in the published volumes (see [15–18]), a recent survey-cum-expository review article (see [21]) will be potentially useful in order to motivate further researches and developments involving a wide variety of operators of basic (or q -) calculus and fractional q -calculus and their widespread applications in Geometric Function Theory of Complex Analysis. In the same survey-cum-expository review article (see [21]), it is also pointed out as to how known results for the q -calculus can easily (and possibly trivially) be translated into the corresponding results for the so-called (p, q) -calculus (with $0 < q < p \leq 1$) by applying some obvious parametric and argument variations, the additional parameter p being redundant (or superfluous).

Finally, I take this opportunity to thank all of the participating authors, and the referees and the peer-reviewers, for their invaluable contributions toward the remarkable success of each of the above-mentioned Special Issues. I do also greatly appreciate the editorial and managerial help and assistance provided efficiently and generously by Mr. Philip Li, Ms. Linda Cui and Ms. Grace Wang, and also many of their colleagues and associates in the Editorial Office of *Symmetry*.

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