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Comments on “Exact expansions of arbitrary tensor functions $\mathbf{F}(\mathbf{A})$ and their derivatives” [Int. J. Solids Struct. 41 (2004) 337–349]

Mikhail Itskov *

Department of Applied Mechanics and Fluid Dynamics, University of Bayreuth, Universitaetsstr. 30, 95440 Bayreuth, Germany

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In his paper J. Lu presents a finite term expansion for a tensor function $\mathbf{F}(\mathbf{A})$ defined by a tensor power series. Although the approach given in the paper may be novel, the results are, however, already known. Indeed, closed-form singularity-free representations for the function $\mathbf{F}(\mathbf{A})$ and its derivative have been given by Itskov and Aksel (2002) for the three-dimensional case and by Itskov (2003a) for the general n -dimensional case. The latter solution is based on the definition of the tensor function $\mathbf{F}(\mathbf{A})$ by the so-called Dunford–Taylor integral. It appears to be advantageous in comparison with infinite power series since the problems of convergence are thus avoided.

These papers are relatively recent and could be overlooked by J. Lu. In the conclusion he cites, however, another work (Itskov, 2003b), where the above mentioned articles are not only referenced but also discussed in detail. It is also strange that J. Lu mentioned my paper only in the context of the exponential tensor function though a large class of tensor functions defined by the Dunford–Taylor integral are addressed there. The exponential function is used only to illustrate some of our results.

Authors Closure

I would like to thank Dr. Itskov for his comments and for bringing up his papers on tensor functions. Dr. Itskov’s publication (Computation of the exponential and other isotropic tensor functions and their derivation, *Computer Methods in Applied Mechanics and Engineering* 192 (2003) 3985–3999) was brought to my attention at the final review of my paper. At that time, I was primarily concerned with the methods, and less so with the results. I should have explicitly stated that the results have been obtained by Dr. Itskov using a different method. In addition, I should have made complete reference to Dr. Itskov’s publications on this subject. Nevertheless, I thought my work indeed provides a different perspective in understanding the tensor series.

* Tel.: +49-921-557262; fax: +49-921-55847262.

E-mail address: mikhail.itskov@uni-bayreuth.de (M. Itskov).

Jia Lu

Department of Mechanical and Industrial Engineering

Center for Computer Aided Design

University of Iowa

Iowa City, IA 52242, USA

Tel.: +1-319-3356405

E-mail address: jialu@engineering.uiowa.edu

References

- Itskov, M., 2003a. Application of the Dunford–Taylor integral to isotropic tensor functions and their derivatives. *Proc. R. Soc. Lond. A* 459, 1449–1457.
- Itskov, M., 2003b. Computation of the exponential and other isotropic tensor functions and their derivative. *Comp. Meth. Appl. Mech. Engrg.* 192, 3985–3999.
- Itskov, M., Aksel, N., 2002. A closed-form representation for the derivative of non-symmetric tensor power series. *Int. J. Solids Struct.* 39, 5963–5978.