



SDI Review Form 1.6

PART 1:

Journal Name:	British Journal of Mathematics & Computer Science
Manuscript Number:	MS: 2012 BJMCS 2725
Title of the Manuscript:	Piece-wise Information for the Truncated Cosinor Model

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PART 2: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	The manuscript is devoted to so called cosinor model which is equivalent to well known trigonometric regression model of the first order. A considerable part of the manuscript (pp.1-6) is not very perfect retelling of the paper by C. P. Kitsos, D. M. Titterington, and B. Torsney --- An Optimal Design Problem in Rhythmometry, Biometrics 44, 657-671 (1988). This part should be considerably shorten and should include a motivation of this retelling. The next part (pp. 7-12) is devoted to derivation of some representations for the Fisher information matrix for the model considered in the case of three point designs. Let me say that I do not know enough reason in order to rename the Fisher information matrix by a-o-p matrix as it is done in the paper. As about derivation of those representations it is tedious but quite straightforward and the linear algebra results which are used are well known. Thus I think that technical details should be moved in an Appendix, but a discussion and some numerical illustrations should be added in the main part of the paper. As about the value of the representations they seem to be convenient but neither theoretical nor practical motivation is given. In fact, in the conclusions (the end of page 12 and a third of the next page) some reasoning is given but it is not illustrated by numerical calculations or real case reference. There are many ways to split 3x3 positive definite matrix into three parts of rank 1 (e.g., according to three design points or by representation through eigenvectors). Why the representation suggested here is more interesting? By this reason I think that the announced "new method" is not properly justified.	We only try to link this paper with the work of Kitsos, C-P., Titterington, D-M. and Torsney, B. (1988). The a-p-o information matrix is based on Fisher's information, see Section 1(see also Ford, I., Kitsos, C.P., Titterington, D.M. (1989). Recent Advances in Nonlinear Experimental Design. Technometrics, 31, 49-60) and Kitsos, C.P. (1986). Design and Inference in Nonlinear Problems. PhD thesis, University of Glasgow, UK. The linear Algebra was adopted as link to the involved geometry we tried to present. We did not introduce linear Algebra's ideas but a new geometric approach for the optimal experimental design, and therefore the appropriate (linear algebraic) notions were used. The idea of an Appendix for the matrix calculations is adopted and we are thankful. We add the following text after eq. (3.5) in pg. 6.: "There are many ways to split the a-p-o information matrix into three parts. Here, the most appropriate was chosen, using as a criterion the times \$t_A\$, \$t_B\$ and \$t_C\$ below, and relations (3.6), (3.7) and (3.8) respectively."



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	Some specific comments 1. The function η in (2.1) and (2.2) is not the same. It is formally not correct to use the same symbol. And in general, notation is not very convenient. 2. The logic of the manuscript is not easy to follow. Why at all it is needed to retell so much from a previous paper? Why D- optimal designs are of interest here? Why namely four point D-optimal designs are considered? How the general phrase about uncertainty (p. 1_12) should be interpreted? 3. The first reference is not in fact used in the manuscript. 4. There is a lot if examples for applications of Elfving theorem for trigonometric regression models. It seems reasonable to include a reference to some of them.	Moreover, we have deleted he following: pg. 1 (1st parag.): “in terms... of information”. pg. 2 (bottom): “and the estimates... Kitsos et al.”. pg. 3 (2nd parag.): “Moreover any equality... can be produced”. pg. 4: eq. (2,15). pg. 7: eq. (3.11) and the above removed and added as Appendix. pg. 8: unnumbered eq. after “Applying the above to...” shorten and the detailed part of it moved to Appendix. pg. 9: eq. (3.20) shorten and the detailed part of it moved to Appendix. pg. 11: eq. (3.38) shorten and the detailed part of it moved to Appendix. pg. 12: eq. (3.40) and (3.41) shorten and the detailed part of them moved to Appendix. An Appendix section was added as well as the Acknowledgements. Specific Comments: 1. We correct the text referred to this notation. 2. The D-optimal design is the most applicable one. Here it is referred in comparison to the c-optimal design. We decided 4-point design as it is rather easy to obtain 4 measurements per day. Uncertainty is related to variance and variance to Fisher’s information which is related to the a-p-o information matrix. 3. The first reference was added in a new line in the Section 4. 4. Elfving’s theorem is very important for the c-optimality. Two new references were
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		also added (biorhythms applications with trigonometric regression approach), see 1 st par. of Section 2 and Section 4.
<u>Minor</u> REVISION comments		
<u>Optional/General</u> comments		