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SDI Review Form 1.6

Journal Name:	Advances in Research
Manuscript Number:	**Ms_AIR_27621**
Title of the Manuscript:	**Approximate Solutions of Nonsmooth Systems via Generalized Euler-Lagrange and Hamiltonian Equations**
Type of the Article	**Original Research Article**

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty'**, provided the manuscript is scientifically robust and technically sound.
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PART 1: **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	This paper generalizes the Euler-Lagrange equations for systems of non-smooth functions. This paper addresses an important problem and seems to be technically correct; however, it is in serious need of a careful proof-read of word choice and syntax, etc. I especially appreciate the inclusion of test problems by the author(s), but the paper would also benefit from a bit clearer explanation of two of the test problems, Example 5.1 and Example 5.2, and a completion of these examples. After these revisions I recommend the paper be published. With respect to Example 5.1 and 5.2, I have the following concern: In Example 5.1 it is not clear to me what is the connection between the sum aj cos(pi j xdot) to L, x, etc. I think the derivative of L with respect to xdot is the sum aj cos (pi j xdot) and that this relationship is used to define the aj's, but I am not completely sure. This should be clarified in this example. In Example 5.2 I think the sum aj cos(pi j x) is the derivative of L	Dear Reviewer : thank you for your useful comments and suggestions on the structure of our manuscript. Based on your recommendations and deep comments, we made the following changes in the paper: Based on Remark 2.1 it is clear that the derivative of L with respect to xdot is the sum aj cos (pi j xdot) and that, this relation is used to approximate the aj's. Also, in Example 5.2, the sum aj cos(pi j x) is the derivative of L with respect to x and bj cos(pi j xdot) is the derivative of L with respect to xdot, and this is clear from Remark 2.1. we emphasized that for computing applications, we approximate the GDs by a finite sum such as finite Fourier series. We add the following text after Example 5.1 and 5.2 to clear the computational method : « In these examples, it is hard to solve GEL equations (5.4) and (5.8), analytically. Using numerical method for

	with respect to x and bj cos(pi j xdot) is the derivative of L with respect to xdot, but again I am unsure and the appropriate relationship should be stated explicitly in the examples. You state in section 1 that the method you present is "practical", but a solution containing an infinite sum (as is Examples 5.1 and 5.2) is hardly "practical". Presumably the practical solution is to approximate the infinite sum with a finite sum. In that case the solution of these problems should suggest a number of terms to use in a practical application of solving these examples. Once this is done, explicitly give the aj and bj values that result. When this is done, the GEL equation in both of these examples will not produce an exact solution to the original problem. The next step should be to solve the original equation numerically and the GEL numerically and compare (e.g with a plot or other method) the results for x(t) in each case. In this way you will have demonstrated the ability of your method to give a "practical" method of solving the given problems.	solving these problems can be usefull and may be considered in future works. For this purpose, the problems (5.4) and (5.8) are approximated as the finite dimensional problems for j =1, 2, · · · , N , where N∈ N is a given big number. » So, the infinite dimensional problem (5.4) and (5.8) are approximated by a finite dimensional problem. Note that, with placement, aj and bj, j=0,1,2,...are the optimal solution of problem 2.1. Using numerical method for solving these problems can be considered in future works

Minor REVISION comments	With respect to the word choice problem, I noted the following words misused or misspelled (there are probably more): Abstract: constrined for constrained Section 1: extermizing for extremizing? appliacation for applications dose for does Section 3. not for no taught for thought Rockfallar for Rockafellar Section 3.2 apecified for specified Section 4 continuouse for continuous matrixes for matrices requaires for requires cofficients for coefficients With respect to the syntax problems, I noted the following problems: Section 1: Other generalized derivatives have been proposed...are not practical (run on sentence) We present [a] different definition.. (The "a" is missing.)	We have modified the manuscript accordingly, and detailed corrections are listed with yellow text point by point. Thank you for your time and for your comments.

	"by assumption" should be "by assuming" One way, "One" is not the beginning of a sentence and should not be capitalized. “we need to impose another conditions …” use the word “other” instead of the word “another”. “that presented by [Kamyad..” should be “that was presented by [Kamyad...” where the derivative [is] replaced by ... (“is” is missing.) “We proposed necessary..” should read “We propose necessary..” Section 2: “we utilize it” should read “we use it” Section 3: “that there are not such…” should read “that there are no such…” “CRockafella,larke et al.” (something is wrong here, but I can't fix it) Section 3.2 “We wants to find…” should read “We want to find…” “x that satisfy the boundary..” should read “x that satisfies the boundary..” I think the script small L following equation 3.5 should probably be kappa I think lambda in Theorem 3.6 is only a constant in x, but not in t, like it is in Theorem 3.7.	

	"f" in Theorem 3.6 is not defined in the theorem statement.	
Optional/General comments		