Manuscript ID: 270177  
Title: An Efficient Hybrid Method of EI-MoM-PO and EDM for Scattering from Electrically Large Objects  
Author: Xiao-Hua Wang; Univ. of Elec. Scie. & Tech. of China  
  
Dear Dr. Wang:  
  
We regret to advise you that your manuscript has not been accepted for publication in Optics Express. The reviewer comments are included below.  
  
After very careful review of this manuscript and all reviewer comments, it is my judgement that this manuscript does not satisfy the Optics Express Review Criteria:     
  
<https://www.osapublishing.org/DirectPDFAccess/D85F4543-D267-F56C-422F47229E2AB171_331385/oe-23-22-28106.pdf?da=1&id=331385&seq=0&mobile=no>  
  
with respect to Technical Scope.   Specifically, I do not consider that this manuscript has a strong connection to optics and photonics, as required [see Optics Express, vol. 23, No. 22, doi: 10.1364/OE.23.028106, 19 Oct 2015] by the currently Optics Express Review Criteria.  
  
Thank you for submitting your manuscript to Optics Express.  If you have any questions, please contact the journal assistant at [opex@osa.org](mailto:opex@osa.org).  We hope that we will be able to serve you in the future.  
   
Sincerely,  
David Shealy  
Associate Editor, Optics Express  
  
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Reviewer 1:  
The authors of this paper introduced a new hybrid method to deal with the scattering from electrically large, 3D PEC objects. Their results show that the new hybrid method is more efficient than the conventional MoM-PO and EDM methods and it has high accuracy and can greatly reduce the computational time. Their results can find application in dealing with the onboard-antenna problems. The paper is clearly written and the previous work is well documented. I think it should be accepted as it stands.   
Reviewer 2:  
In this paper, the authors investigate a numerical method combining EI-MoM-PO and EDM. It is validated through numerical calculation that the proposed method is efficient for characterizing electrically large objects. The numerical results agree well with full-wave EM simulations (conducted by FEKO).  
Reviewer 3:  
Review of "An Efficient Hybrid Method of EI-MoM-PO and EDM for Scattering from Electrically Large Objects" by Xiao et al.  
  
This is a nice paper that presents a new method combining the method of moments and physical optics technique to examine the EM field generated by large objects.  
  
Overall, I believe this paper is worth publishing in Optics Express with some edits, mostly grammer related, which I will now go over.  
  
First, the minor scientific questions that could be dealt with quite quickly:  
  
  
1. On page 1, in the introduction, the authors mention the importance of remote sensing of electrically large objects, they wish to also reference a paper that examined light  scattering from large particles in great detail from a fundamental point of view, they may wish to refer to this:  
  
Brown, Adrian J. “Equivalence Relations and Symmetries for Laboratory, LIDAR, and Planetary Müeller Matrix Scattering Geometries.” Journal of the Optical Society of America A 31, no. 12 (December 1, 2014): 2789. doi:10.1364/JOSAA.31.002789.  
  
and this for small particles:  
  
Brown, Adrian J. “Spectral Bluing Induced by Small Particles under the Mie and Rayleigh Regimes.” Icarus 239 (2014): 85–95. doi:10.1016/j.icarus.2014.05.042.  
  
  
2. On page 2 in the Introduction the authors suggest they are using the equivalence principle, which equivalence principle are they talking about? A reference would be good.  
  
3. On page 3, the authors refer to the EDM at the bottom of the page - what is this referring to?  
  
4. On page 3, the authors refer to the RWG basis functions but they do not define the In terms in eqn 8 and 9. Can these be explained a little more directly after eqn 9?  
  
5. On page 4, the authors say "superscript "0" indicates that iteration does not happen". This needs some rewording for clarification.  
  
6. The authors use the term "PO approximation" - can they be more clear about what aspect of the PO approximation is being used?  
  
7. It's not clear from the paper how the RWG basis function is linked to the common edge. Can the authors explain this a little more?  
  
8. On page 5, The authors mention "vector from free vertex" - can they explain this a little better?  
  
9. On the bottom of page 5, the authors should list the relevant equation numbers behind the words EDM and MoM.  
  
10. On page 7, the authors use the term FEKO but it is not defined.  
  
11. On page 7, the authors use the notation theta theta polarization but do not explain what it means.  
  
Finally, there a few problems with grammar that should also be easy to fix:  
  
page 1  
  
abstract  
  
"adopted to fill MoM" should be "adapted to fill the MoM"  
  
delete "obviously"  
  
"be implemented and" should be "implement and"  
  
"The numerical" should be "Our numerical"  
  
"And the" should be "The"  
  
"shows the good robustness of this proposed method" should be "demonstrates the robustness of our methods"  
  
"So it is especially applicable" should be "It is especially suitable"  
  
"with electrically" should be "with an electrically"  
  
page 2  
  
"is a tradeoff" should be "is always a tradeoff"  
  
"the complexities of objects" shoud be "complexity of natural objects"  
  
"to be implemented" should be "to implement"  
  
"using equivalence" should be "using the equivalence"  
  
delete "the current based"  
  
"modifying" should be "1.) modifying"  
  
"iterating" should be "2.) iterating"  
  
"account of the" should be "account"  
  
"as additional" should be "as an additional"  
  
"And in general" should be "In general"  
  
"method avoids" should be "methods avoid"  
  
"it is more" should be "and are thus more"  
  
"time, as to" should be "time, for"  
  
"caused by" should be "describing"  
  
delete "One way is to reduce the unknowns to alleviate this disadvantage. "  
  
"Therefore, high" should be "High"  
  
"on this idea" should be "on reducing the number of unknowns"  
  
"so flexible to" should be "flexible enough to"  
  
"way is to" should be "method is to"  
  
"such as efficient" should be "such as an efficient"  
  
"for onboard antenna with" should be "for an onboard antenna with an"  
  
"with conventional" should be "with the conventional"  
  
"and almost" should be "and has almost"  
  
"analyzing electrically" should be "analyzing an electrically"  
  
"procedure, equivalent" should be "procedure the equivalent"  
  
page 3  
  
delete "the most"  
  
"It shows a good prospect" should be "This method shows promise"  
  
"Also, the" should be "The"  
  
"are provided" should be "are also provided"  
  
"conclusion is given" should be "conclusions are given"  
  
"by monochromatic" should be "by a monochromatic"  
  
"and the parts" should be "including the parts"  
  
"Then the" should be "The"  
  
"for operations" should be "for integral operators"  
  
"And the" should be "The"  
  
page 4  
  
"Galerkin" should be "the Galerkin"  
  
"And according" should be "According"  
  
"And the elements on" should be "The elements of"  
  
"adopting PO" should be 'adopting the PO"  
  
"Then by using" should be "Using"  
  
"expanding coefficents" should be "expansion coefficient"  
  
"of kth" should be "of the kth"  
  
"to kth" should be "to the kth"  
  
"Considering" should be "To address"  
  
"carried out" should be "calculated"  
  
"voltage" should be "voltage in the next iteration step"  
  
page 5  
  
"can be established by updating" should be "is thus established to update"  
  
"expanding" should be "expansion"  
  
"If the" should be "The"  
  
"is can be" should be "and thus can be"  
  
"has been satisfied" should be "is satisfied"  
  
"with sufficiently" should be "of sufficiently"  
  
"then the" should be "The  
  
"can be replaced" should be "can then be replaced"  
  
"nth" should be "the nth"  
  
"Then the radiated" should be "The radiated"  
  
"can be" should be "can then be"  
  
"of nth" should be "of the nth"  
  
page 6  
  
"of MoM" should be "of the MoM"  
  
"as PO region" should be "with the PO region"  
  
"have still to take the tedious" should be "still represent a significant"  
  
"If fill MoM" should be "If we fill the MoM"  
  
"by EDM" should be "by the EDM"  
  
"as secondary" should be "considered as a secondary"  
  
"generate impressed" should be "generate an impressed"  
  
"represents moment" should be "represents the moment"  
  
"The Jpo works" should be "Jpo then works"  
  
"and extra" should be "and the extra"  
  
"in MoM" should be "in the MoM"  
  
"gotten" should be "obtained"  
  
"And the" should be "The"  
  
"with EDM" should be "with the EDM"  
  
page 7  
  
"Details about" should be "Details of"  
  
"placed on" should be "placed at"  
  
"there are 13" should be "13"  
  
"to meet the requirement of convergence precision" should  be "are required for convergence"  
  
"It is an effective method" should be "It is thus an effective method when used"  
  
page 8  
  
"mentioned" should be "used"  
  
"methods, good" should be "methods, is is seen that good"  
  
"with the increment" should be "the increment"  
  
"And in" should be "In"  
  
page 9  
  
"found that" should be "seen that"  
  
delete "according to the results by the proposed method"  
  
"only after a" should be "after only a"  
  
"can converges" should be "converges satisfactorily"  
  
page 10  
  
"Comparing" should be "Compared"  
  
"is easier to be constructed by using the proposed method. And good agreement is achieved. In the meantime, for the robustness of it, numerical studies of the second numerical example with different mesh sizes in the PO region are considered. The insensitivity of mesh size also shows good robustness of this proposed method." should be "is easier to construct using our approach. The insensitivity of mesh size is a remarkable aspect of the proposed method."  
Reviewer 4:  
Comments could be found in the attachment.  
<http://prism.osapublishing.org/Media/ViewMediaFile?mediaId=2275254&token=621f5ca8c737dd413becd0d603eb1d205efebee0>  
Reviewer 5:  
This manuscript proposes an efficient hybrid method for calculating the electromagnetic scattering and radiation from electrically large, three-dimensional (3D), perfect electric conductor (PEC) objects. I can recommend publication in Optics Express after the authors address the following concerns:  
  
1) It appears that the equivalent dipole moment method has been already adopted to fill the MoM impedance matrix and thus significantly reduce the total solution time with high accuracy in dielectric materials (see [1]). Can the authors comment on their contribution with respect to that previous (not cited) work?  
  
2) Since both the EI-MoM-PO and the EDM have been already presented in the literature, in the theoretical formulation section, more emphasis should be given to the combination of both methods, perhaps showing the expression of the final equations. "In order to reduce the number of MoM matrix elements, most of regions will be grouped as PO region.". Is there any criterion for choosing which regions should be grouped as PO and which not? What is the effect of such assumption?  
  
In addition, here is a list of minor comments:  
  
- Abbreviatures should be avoided in the title.  
  
- In the first paragraph of the introduction, after the enumeration of the applications, references are needed.  
  
- When introducing Galerkin matching method, a reference is needed.  
  
- Numerical results are compared with FEKO. A reference is needed. The iterative threshold is different in the two examples, why?  
  
- Use of english should be revised throught the manuscript.  
  
References  
[1] 1. Yu, C., Yuan, J. & Gu, C. Equivalent dipole-moment method for electromagnetic scattering by dielectric bodies. in 924–927 (IEEE, 2009). doi:10.1109/MAPE.2009.5355812.  
Reviewer 6:  
The manuscript proposes a hybrid method of efficient iterative method of moments-physical optics (EIMoM-PO) and equivalent dipole moment (EDM) to calculate the electromagnetic scattering and radiation from electrically large, three-dimensional and perfect electric conductor objects.  
  
The problem that the paper is addressing is out of scope of Optics Express and it does not belong to Optics Express..