Authors' replies to Reviews

Extending EIASC for multidimensional type-reduction

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Note: For easy viewing, please note that all replies are presented in bold character.

Comment 1

Prove that minimizing / maximizing distance to origin is same as the two optimization problems associated with computing the centroid.

Authors' Comment

We have proved the existence of a hyper-planar switch boundary for which, if an embedded T1-FS is constructed taking UMF for points beyond and LMF for points before it, has the centroid on the centroid bounding surface, i.e. on type-reduction gives an extreme centroid. The proofs are given is section 3.

Comment 2

Use EIASC and not KM/EKM

Authors' Comment

In our paper, the algorithm proposed is an extension of EIASC and not KM/EKM.

Comment 3

Check "On KM Algorithms for Solving Type-2 Fuzzy Set Problems" by Jerry M. Mendel published in IEEE Transactions on Fuzzy Systems 2013.

Authors' Comment

We went through this paper, and the ideas summarized helped us in developing our proofs in section 6.

Comment 4

Demonstrate you can achieve solution for 2-D problems using new "algorithm". Elaborate on speed and no. of iteration.

Authors' Comment

Section 3 explains the existence of a switching hyper-plane, which is the reason for the correctness of the method proposed in section 4. In section 5 we have shown why the method always converges, thus establishing it as a correct "algorithm". Section 7 gives visualization for shape and location properties on 2-D type-reduction problems as well as the time complexity of the algorithm in 2-D in the final paragraph.

Comment 5

Study properties of the two optimization problems.

Authors' Comment

The properties of the two optimization have been thoroughly studied, leading to the idea behind the shape and location properties which are elementary to the convergence proof of the proposed algorithm. The location and shape properties are presented in section 6.

Comment 6

Connect the 2-D optimization problem with same sort of new KM-like optimization problem.

Authors' Comment

Section 4 shows that when 2-D optimization problem, when reduced to 1-D, is identical to the left and right bounding centroid finding problem, which is solved using KM algorithm. This establishes the analogy between 1-D and 2-D type-reducion problem.