

Reply to the Referee 1

Re: (Manuscript Number: GAPA-2019-0596) “Nonlinear Separation Methods and Applications for Vector Equilibrium Problems Using Improvement Sets” by Yang Dong Xu, Cheng Yu Lei and Chun Yu Sun

We are thankful to this referee for the comments on the paper. The paper has been revised following the report. The detailed revisions are listed below.

- (1) Page 2, line 25: “inequalitiy” has been replaced by “inequality”.
- (2) Page 3, line 3: “in the image space (IS)” has been replaced by “in the IS”.
- (3) Page 3, line 4: “ linear and nonlinear regular weak separation functions” has been replaced by “ linear or nonlinear regular weak separation functions”.
- (4) Page 3, line 6: “improvement sets may be not convex or not a cone” has been replaced by “improvement sets may be not convex or not cone”.
- (5) Page 4, line 5:

$$“P^* := \{z \in \mathbb{R}^n : \langle z, y \rangle \geq 0, \forall y \in P\}.$$

$$P^\# := \{z \in \mathbb{R}^n : \langle z, y \rangle > 0, \forall y \in P \setminus \{0_{\mathbb{R}_m}\}\}.”$$

has been replaced by

$$“P^* := \{z \in \mathbb{R}^n : \langle z, y \rangle \geq 0, \forall y \in P\},$$

$$P^\# := \{z \in \mathbb{R}^n : \langle z, y \rangle > 0, \forall y \in P \setminus \{0_{\mathbb{R}_m}\}\},”$$

- (6) Page 4, line -1: the comma “,” has been replaced by the full stop “.”.
- (7) Page 6, line -1: the semicolon “;” has been replaced by the full stop “.”.
- (8) Page 7, line 17: we have added the full stop “.” after the following expression

$$\hat{w}(u_0, v_0; \theta, \mathcal{A}) > 0, \forall (\theta, \mathcal{A}) \in E^\# \times S_+^l$$

- (9) Page 9, line 22: we have added the full stop “.” after the following expression

$$\forall v \notin D, \exists \gamma_v \in \Gamma \text{ s.t. } \underline{w}(v; \gamma_v) < 0$$

(10) Page 16, line 5: the semicolon “ $\Upsilon = \langle N, (\Lambda_i)_{i \in N}, (u_i)_{i \in N} \rangle$ ” has been replaced by the full stop “ $\Upsilon = \langle N, (\Lambda_i)_{i \in N}, (\phi_i)_{i \in N} \rangle$ ”.

(11) Page 16, lines 13-14:

$$“(a(b_i))_j = \begin{cases} a_j & \text{if } j \neq i, \\ b_j, & \text{if } j = i. \end{cases}”$$

has been replaced by

$$“(a(b_i))_j = \begin{cases} a_j, & \text{if } j \neq i, \\ b_j, & \text{if } j = i. \end{cases}”$$

(12) Page 21, line 12: “Luo, H.Z., Wu, H.X., Liu, J.Z.” has been replaced by “Luo, H.Z. Wu, H.X., Liu, J.Z.”.