Errata for "Hybrid Kinematic Control for Rigid Body Pose Stabilization using Dual Quaternions"

In the proof of Lemma 2 it is said that the graph of the set-valued mapping $\vec{G}$ is $\mathbb{R}^8 \times \mathbb{R} \times \mathbb{R}^8 \times \{-1, 1\}$. This is not valid, as the graph is in fact

$$\mathbb{R}^8 \times \mathbb{R} \times \{x \in \mathbb{R}^8 \,:\, x_1 < 0\} \times \{-1\} \cup \mathbb{R}^8 \times \mathbb{R} \times \{x \in \mathbb{R}^8 \,:\, x_1 = 0\} \times \{-1, 1\} \cup \mathbb{R}^8 \times \mathbb{R} \times \{x \in \mathbb{R}^8 \,:\, x_1 > 0\} \times \{1\}.$$

In the following we given an alternative proof that $\vec{G}$ is outer semicontinuous.

Proof. It suffices to prove that each component of $\vec{G}$ is outer semicontinuous. The map $(\mathbf{x}, y) \mapsto \mathbf{x}$ is a projection, thus it is continuous. The map $(\mathbf{x}, y) \mapsto \overline{\mathrm{sgn}}\,(x_1)$ is outer semicontinuous because its graph is

$$\left\{(\mathbf{x}, y, -1) \in \mathbb{R}^{10} : x_1 \leq 0\right\} \cup \left\{(\mathbf{x}, y, 1) \in \mathbb{R}^{10} : x_1 \geq 0\right\},$$

a closed subset of $\mathbb{R}^{10}$. □