Remark on the paper "On the expansion rate of Margulis expanders"

It was pointed pointed to us by Zeev Dvir that the machinery introduced for the proof of Theroem 2.1 (lemma 4.4) is not needed (the non-directed case). However, for the directed case we still need the symmetries introduced in the **Sketch of proof**.

Indeed, going straight to the proof of the theorem, we let $A_i = A \cap Q_i$ (where Q_i is the ith quadrant). We observe the following:

- $S(A_1), T(A_1) \subset Q_1$, $S(A_1) \cap T(A_1) = \emptyset$.
- $S^{-1}(A_2), T^{-1}(A_2) \subset Q_2$, $S^{-1}(A_2) \cap T^{-1}(A_2) = \emptyset$.
- $S(A_3), T(A_3) \subset Q_3$, $S(A_3) \cap T(A_3) = \emptyset$.
- $S^{-1}(A_4), T^{-1}(A_4) \subset Q_4$, $S^{-1}(A_4) \cap T^{-1}(A_4) = \emptyset$.

This results in $|U(A)| \geq |S(A_1) \cup T(A_1) \cup S^{-1}(A_2) \cup T^{-1}(A_2) \cup S(A_3) \cup T(A_3) \cup S^{-1}(A_4) \cup T^{-1}(A_4)| = |S(A_1)| + |T(A_1)| + |S^{-1}(A_2)| + |T^{-1}(A_2)| + |S(A_3)| + |T(A_3)| + |S^{-1}(A_4)| + |T^{-1}(A_4)|$.

So we have $\mu(A) \geq \frac{|S(A_1)|+|T(A_1)|+|S^{-1}(A_2)|+|T^{-1}(A_2)|+|S(A_3)|+|T(A_3)|+|S^{-1}(A_4)|+|T^{-1}(A_4)|}{|A_1|+|A_2|+|A_3|+|A_4|} = 2$ by lemma 4.2.∎