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Title: Algebraic approach to equivariance of solutions for an iterative equation

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Describing the symmetry of a mapping by equivariance with respect to a linear transformation group, the reference [Proc. Roy. Soc. Edinburgh **A130** (2000), 1153–1163] gave the existence of equivariant solutions of the polynomial-like iterative equation under the action of topologically finitely generated subgroups of $GL(\mathbb{R})$ on $\mathbb{R}$ and the orthogonal group $\mathbf{O}(N)$ on $\mathbb{R}^N$ ($N \geq 2$). In this paper, based on the algebraic structure of closed subgroups of $GL(\mathbb{R})$, we prove the equivariance of solutions on $\mathbb{R}$ with respect to closed subgroups of $GL(\mathbb{R})$ and extend the result of $\mathbf{O}(N)$ -equivariance of solutions to the group $\mathbf{O}(N) \times \langle c\mathcal{I}_N \rangle$ on $\mathbb{R}^N$.

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