

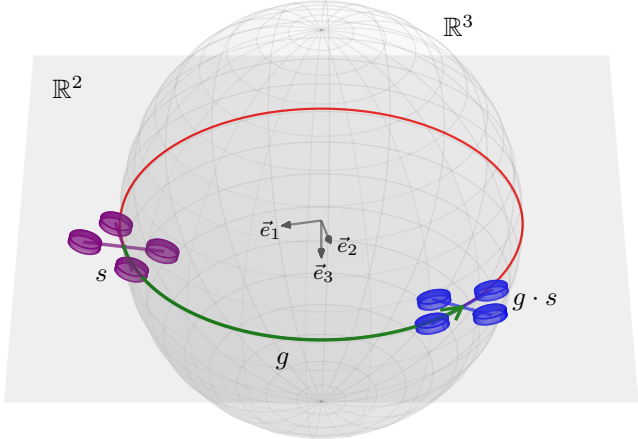


Fig. 1. Illustration of the group action corresponding to the rotation about the vertical axis $\vec{e}_3$. A group element $g \in \text{SO}(3)_{\vec{e}_3}$ (green), which corresponds to $\text{SO}(2)$ embedded in $\text{SO}(3)$ as a subgroup by fixing the axis of rotation as $\vec{e}_3$, acts on a quadrotor state s (purple) by rotating it to a new state $g \cdot s$ (blue). The orbit of s under this action, denoted by $G \cdot s$, is the set of all points reachable by rotations about $\vec{e}_3$, and its projection on the position space corresponds to a circle (red). In the proposed equivariant RL, the control policy learned at a single point on the orbit is automatically generalized to any other points on the orbit.