

On the structures of $\mathrm{SO}(3)$

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The contribution is devoted to selected structures of the special orthogonal group $\mathrm{SO}(3)$. First, we show that every special orthogonal matrix can be expressed as the product of three elementary special orthogonal matrices. Using this canonical decomposition, explicit formulas for smooth atlas on $\mathrm{SO}(3)$ are given. Second, the structure of a principal $\mathrm{SO}(2)$ -bundle over the sphere S^2 is introduced on $\mathrm{SO}(3)$. As a consequence, we discuss the properties of an $\mathrm{SO}(3)$ -action on a topological space.