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Fundamental group of the special orthogonal group SO(n)

Question: What is the fundamental group of the special orthogonal group SO(n) S O (n), n> 2 n> 2? Clarification: The answer usually given is: Z2 Z 2. But I would like to see a proof of that and an isomorphism π1(SO(n),En) → Z2 π 1 (S O (n), E n) → Z 2 that is as explicit as possible. I require a neat criterion to check, if a path in SO(n) S O (n) is null-homotopic or not. Idea 1: Maybe ...

Homotopy groups O(N) and SO(N): $\\pi_m(O(N))$ v.s. $\\pi_m(SO(N))$

As pointed out in the comments, O(N) O (N) consists of two connected components which are both diffeomorphic to SO(N) S O (N). So π0(O(N)) =Z2 π 0 (O (N)) = Z 2, π0(SO(N)) = 0 π 0 (S O (N)) = 0, and for m ≥ 1 m ≥ 1, πm(O(N)) =πm(SO(N)) π m (O (N)) = π m (S O (N)). As for Spin(N) Spin (N), note that is it a double cover of SO(N) S O (N). When N = 1 N = 1, we see that Spin(1) =Z2 ...

Prove that the manifold $SO(n)$ is connected

The question really is that simple: Prove that the manifold SO(n) ⊂ GL(n,R) S O (n) ⊂ G L (n, R) is connected. it is very easy to see that the elements of SO(n) S O (n) are in one-to-one correspondence with the set of orthonormal basis of Rn R n (the set of rows of the matrix of an element of SO(n) S O (n) is such a basis). My idea was to show that given any orthonormal basis (ai)n1 (a i ...

lie groups - Lie Algebra of SO (n) - Mathematics Stack Exchange

Welcome to the language barrier between physicists and mathematicians. Physicists prefer to use hermitian operators, while mathematicians are not biased towards hermitian operators. So for instance, while for mathematicians, the Lie algebra so(n) consists of skew-adjoint matrices (with respect to the Euclidean inner product on Rn), physicists prefer to multiply them by I think − i (or maybe ...

If a couple has 3 girls, what is the probability that their 4th child ...

What is the probability that their 4th child is a son? (2 answers) Closed 9 years ago. As a child is boy or girl; this doesn't depend on it's elder siblings. So the answer must be 1/2, but I found that the answer is 3/4. What's wrong with my reasoning? Here in the question it is not stated that the couple has exactly 4 children

Why $\\operatorname{Spin}(n)$ is the double cover of $SO(n)$?

is called the norm of Cl(Φ) Cl (Φ). We define the pinor group Pin(n) Pin (n) as the kernel of the homomorphism N: Γ → R∗ · 1 N: Γ → R ∗ 1, and the spinor group Spin(n) Spin (n) as Pin(n) ∩Γ+ Pin (n) ∩ Γ +. That's the all information I learnt yet from Clifford Algebras, Clifford Groups, and a Generalization of the Quaternions. I also understand the action of this Clifford ...

Dimension of SO (n) and its generators - Mathematics Stack Exchange

The generators of SO(n) S O (n) are pure imaginary antisymmetric n × n n × n matrices. How can this fact be used to show that the dimension of SO(n) S O (n) is n(n−1) 2 n (n 1) 2? I know that an antisymmetric matrix has n(n−1) 2 n (n 1) 2 degrees of freedom, but I can't take this idea any further in the demonstration of the proof. Thoughts?

How to find the difference between the son's and mother's age if it ...

A son had recently visited his mom and found out that the two digits that form his age (eg :24) when reversed form his mother's age (eg: 42). Later he goes back to his place and finds out that this whole 'age' reversed process occurs 6 times. And if they (mom + son) were lucky it would happen again in future for two more times.

orthogonal matrices - Irreducible representations of $SO (N ...

@Jahan: 2) This is also not a problem. You can check that if a connected Lie group G G acts on a finite-dimensional vector space V V then V V is irreducible as a representation of G G iff it's irreducible as a representation of g g. We aren't classifying all representations here, just checking whether particular representations are irreducible, so the existence of the spin representations ...

Lie Algebra of U(N) and SO(N) - Mathematics Stack Exchange

U(N) and SO(N) are quite important groups in physics. I thought I would find this with an easy google search. Apparently NOT! What is the Lie algebra and Lie bracket of the two groups?