> [!info] Info
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> is written (completely with human hands) by Rupadarshi Ray,
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$$TS^2$$

#wiki/Man/R/4

$$TS^2$$

The vector bundle

$$\begin{array}{c} TS^2 \\ \downarrow \\ S^2 \end{array}$$

is not trivial by

> **(Cannot comb a hairy 2-sphere)** Every continuous tangent vector field on S^2 has a zero.

The manifold TS^2 is not diffeomorphic to $\mathbb{R}^2 \times S^2$. [1]

However,

> **squishy.S2T 2 sym Cquadratic**
>
> $$Z\left(\sum_{1\leq j\leq n} z_j^2 - 1\right)(\mathbb{C}) \cong_{\mathsf{Sym}} T^*S^{n-1}$$
>
> Consider
>
> $$\begin{aligned} Z\left(\sum_{1\leq j\leq n} z_j^2 - 1\right)(\mathbb{C}) &\to \mathbb{R}^n \times \mathbb{R}^n \\ x+iy &\mapsto \left(\frac{x}{|x|}, -|x|y\right) \end{aligned}$$
>
> which
>
> - takes $Z\left(\sum_{1\leq j\leq n} z_j^2 - 1\right)(\mathbb{R})$ to $S^{n-1} \times \{0\}$
>
> [1]

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1. https://arxiv.org/pdf/2510.10669 ↩

Current note has 0 direct children and 0 total descendants.

- stretchy
    - S^2 and $\mathbb{C}\boldsymbol{P}^1$
        - TS^2

And it has 10 siblings.

- stretchy
    - S^2 and $\mathbb{C}\boldsymbol{P}^1$
        - Almost complex structure on S^2 induced from spherical metric and its area form
        - Borsuk-Ulam theorem
        - Cylindrical coordinates on S^2
        - Holomorphic vector bundles on $\mathbb{C}\boldsymbol{P}^1$
        - Round metric on S^2
        - The area form on round S^2
        - Stereographic coordinates on the sphere S^2
        - TS^2
        - Vector fields on S^2
        - Hamiltonian flows on the sphere S^2

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1. https://math.stackexchange.com/a/893560/1290493 ↩