

10th IYNT 2022; Tskneti, Georgia

Problem 10. *Rubber bands heat engine*

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Problem statement:

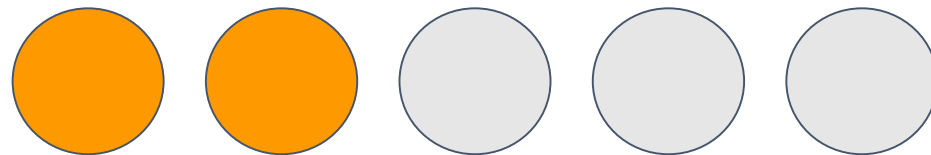
All the **spokes** in a **bicycle wheel** are replaced by **rubber bands**. If the rubber bands on one side of the wheel are **heated**, the wheel starts to **rotate**. **Investigate this effect.**

Theoretical Part

Strong points	Weak points
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1. Partly understood the phenomenon for the construction of the wheel (center of mass movement)
2. Explained the theory clearly and concise
3. Precisely defined the rubber band heat engine

1. Had a vague explanation of the theory
2. Had a vague explanation of the phenomenon: did not explain why rubber bands contract (*explanation of the Gough-Joule effect*)
3. Lacking in mathematical explanation
4. Did not give the coefficient of elasticity, not knowing if it is constant

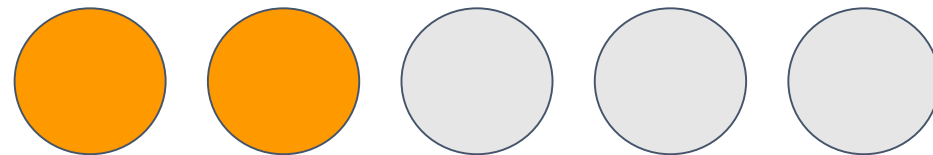


Experimental Part

Strong points	Weak points
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1. Clearly explained the construction for the rubber band wheel, and also showed how it works practically
2. The experiment was performed in a controlled environment

1. Did not vary any parameters
2. Did not present any conclusions
3. No correlation between variables



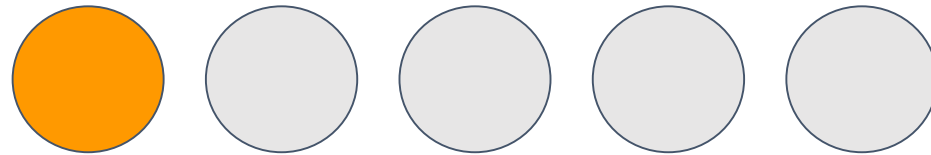
Conclusion

Strong points

1. Showed that the rubber bands heat engine phenomenon is true

Weak points

1. Didn't compare the data from all the experiments
2. Did not give any hypothesis
3. Poor time management
4. No analysis of the data



Discussion topics

1. Did you perform the experiment multiple times (i.e. are your results over an average)?
2. Did you replace the rubber bands each time you performed a measurement?
3. Do you think that used rubber bands behave differently to new rubber bands mounted on the wheel?
4. Disequilibrium and decentralization: Do you think that the wheel could experience disequilibrium and decentralization?

Discussion