



Opposition: Matches on fire

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Problem 3. Matches on fire

When the outermost **match** in a regular array of matches **is lit**, the following matches **ignite** one by one. Investigate the **parameters** that determine **the speed** for such a **fire wave**.

Theory



1. **Qualitative analysis of phenomena**
2. **Had some knowledge of physics of fire spread**
3. **Explained well the role of convection**
4. Noted the turbulent character of the flow BUT didn't explain its significance



1. **No boundaries or quantitative predictions based on the theoretical model**
2. **No comparison between the theoretical model and the obtained data**
3. **Didn't propose a way/function to model the velocity theoretically**
4. **Didn't predict how varying some crucial parameters can change the results**
5. Didn't explain how a match gets lit
6. Mention only of some of the relevant parameters -
7. Noted only 1 way of measuring speed

Experiment



1. **Controlled distance between matches**
2. Varied some of the parameters included in theoretical model



1. **Too few matches in a line examined (slide 12)**
2. **Didn't vary the slope except for purely horizontal/ vertical**
3. **Only straight line attempted**
4. **Didn't explain the effect of some relevant parameters (difference between matches of 1 box)**
5. **Unclear experimental setup**
6. Didn't explain some sources of error
7. Graph for other way of speed measurement could give valuable information
8. Stabilization of matches changing their horizontal distance
9. Didn't control or vary air currents

Questions:

1. Explain heat transfer
2. How would air currents affect speed?
3. How could vertical distance vary speed?
4. Optimal vertical distance?
5. How could vertical angle vary speed?
6. Optimal vertical angle?
7. Comparison speed upwards, horizontally and downwards?
8. Would results be identical if you lit it on both ends?

Questions:

**Thank you for
your attention!**