

## REVIEWS ON THE MANUSCRIPT [13]

### Reviewer 1:

In the presented manuscript the author comes with a numerical solution of the problem of falling dominoes, underlined by high-quality experiments.

Conditioned on their ability of improve lacks presented below, I do support the acceptance of the manuscript.

- Eq. (1) is of a general form. Exact equation used in the model must be presented.
- Eq. (2) desperately needs an underlining picture. I am not convinced it is correct, a factor of  $\sin(\theta)$  seems to be superfluous.
- All Figures must be correctly referenced within the text.
- In Fig. (4), why are experimental points missing for large  $\theta$ 's?
- What exactly is meant under the word "rate" in Figs. 5, 6? Is it the distance between dominoes? If so, I do not see how the line can move for rate=0.
- I would like to suggest to the author(s) to ask for a proofreading by a skilled English speaking person. Some parts of the manuscript are hard to read and understand due to misused words mainly.

### Reviewer 2:

Article presented by the author is interesting and contains original results.

Nevertheless there are serious drawbacks in both the form of the paper and its physical content. In my opinion those disadvantages make this article unsuitable for the publication in IYPT proceedings.

To begin with, the structure of the article is very chaotic and makes a lot of confusion in reader's read.

Names of sections do not always match actual content presented in a given part of the article. In the entire article there is no a single figure that would illustrate physical considerations. In many places it is very disturbing and confusing (especially in the first part that deals with the theoretical description of dominoes).

Another issue that attracted my attention was the description and the quality of graphs attached to the article. This concerns especially graphs 4 and 6 which are very unreadable.

As for the physical side of the paper I found many mistakes and inaccuracies.

The physical description of falling process is unsatisfactory and unclear (equation 1 is unsatisfactory).

I am aware of the work by J. M. J. van Leeuwen (<http://www.lorentz.leidenuniv.nl/~jmjvanl/>), on which approach presented in the article is mostly likely based.

Nevertheless, the author does not cite this reference (nor does he cite any other scientific journal). In my opinion this is one of the biggest drawbacks of this paper.

In the description of the collision process equation 3 and 4 are not justified and properly explained.

What is worse, they are clearly not true as in the moment of collision there is, in general, a non-vanishing component of external forces in the horizontal direction.

There are many more mistakes in physics described in the paper. They are of less importance than the previous two and I am discussing them in more detail.

I do not recommend this paper to be published in IYPT proceedings in its present form.

Serious modifications (not only in the technical level but also in physics) have to be made before the possible acceptance.

It is a pity because the paper contains also very interesting and original results combining the numerical prediction with experimental data.

### **Reviewer 3:**

The author wrote a simulation program for falling dominoes that is able to simulate one or more dominoes and calculate the dependence of the behavior on parameters like height and distance between dominoes.

The author also did an experiment with real dominoes and wrote Matlab scripts that trace the image and calculate the angle of dominoes as a function of time.

It would be very interesting to know more about the actual experiment. Could the actual video be uploaded somewhere? How exactly was the video analyzed in Matlab? It would be nice to see the script.

For the actual program, would it be possible to see the source code? And some instructions how to run it.

Could you explain more the equation (1) and (2)? What is  $F$ ? What do you mean by "Torque()"? Is it a function depending on the parameters somehow? How did you derive the equation (2)?

How exactly do you form the  $2n \times 2n$  linear system? This was not clear to me from the text at all.

I believe that research must be reproducible, and so from reading the text I should be able to write such a program myself, reproducing the results. So I would suggest to explain things in more detail, and also to post the source code somewhere online (I suggest GitHub, but you can of course use anything else), so that it becomes more clear how the program works.

From the graphs, the agreement of the theory and experiment seems remarkable. And you seem to have done a lot of work.

## **Editorial request**

We agree to the prevailing opinion of all reviewers that a number of details need to be fixed and clarified. We acknowledge, however, a sufficiently high level of results and data interpretation, despite the serious concerns of the Reviewer 2.

After thorough consideration and evaluation of the reviews and of the manuscript, we take the editorial decision to request revision.

**Work by van Leeuwen et al.:** we need either scrupulous references to all methods and concepts that are not of own work, either a justified rebuttal of the conclusions made by the Reviewer 2.

Provide references to all publications that influenced on or were used in the project. If none were used, still consider adding references as the current manuscript is deemed *related* to multiple publications of the past, at least by its topic and scope.

Consider explaining the novelty of the project in the conclusions.

**Video analysis:** consider adding one or several snapshots of the video with plexiglas dominoes. As suggested by the Reviewer 3, consider sharing online some of the videos.

**Script:** consider describing the script in more details or publishing it as online supporting material, as suggested by Reviewer 3. The IYPT Archive can take care for safekeeping this online supporting material for the book.

**Validity of eqs 3 and 4:** please check rigorously and resolve the concerns of the Reviewer 2 that the equations are wrong.

**Any further clarifications:** check and resolve the issues mentioned by each reviewer.