REVIEW RESPONSE LETTER [13]

Domino Effect Motion Investigation: A numerical approach – Iran – Alireza Tahmaseb Zadeh

Dear Reviewers,

Thank you for reviewing the manuscript, which hopefully will help improving it to a better scientific level.

In order to support flaws in the original paper, I have put a Supplementary file in my website as the online material for the paper. This file includes some videos from the experiments along with their video analyzed and simulation versions, two other extra videos, graphs in color and higher quality, all the MATLAB scripts with the HELP file to understand how to use them, pictures from the setup and real dominoes and finally a "Supplementary document file". This "Supplementary document file" is a report on the physical theory and modeling of the problem in more details. All these files and videos are compressed and the final size is 9 MB.

The supplementary file is uploaded at:

http://tami-co.com/index.php?option=com_content&view=article&id=44&Itemid=5

Reviewer 1:

In the following, the points mentioned in the review are discussed:

Eq. (1) is of a general form. Exact equation used in the model must be presented.

It is now added to the paper.

- Eq. (2) desperately needs an underlining picture. I am not convinced it is correct, a factor of sin(theta) seems to be superfluous.

It is now added to the paper

All Figures must be correctly referenced within the text.

It is now added to the paper.

In Fig. (4), why are experimental points missing for large Thetas?

It refers to our MATLAB video processing program. The program tracks a line on each of dominoes and uses 2 points on that line to get the gradient=(y2-y1)/(x2-x1) of that line. In large thetas amount of

gradient is too big (lim(x2-x1)=0) and this results in inaccurate thetas (theta=arctan(gradient)). So data larger than a threshold is omitted.

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.

Rate is the height increase rate. This means that the height of n+1 domino Is height of n domino plus rate(i.e in rate=0 all dominoes have the same height). In the situation that rate=0, the amount of energy loss is equal to amount of energy gain due to potential energy and the line can't move.

Extra description on the meaning of RATE is added in the paper.

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

is unsatisfactory).

Extra information added to the paper

Reviewer 2:

Names of sections do not always match actual content presented in a given part of the article.

Changed in the new manuscript.

In the entire article there is no a single figure that would illustrate physical considerations.

A picture is now added to the paper.

In many places it is very disturbing and confusing (especially in the first part that deals with the theoretical description of dominoes

Extra information is now provided.

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.

I had never seen this article before. But I agree that it should be referenced. Also there are major differences between our modeling and programming and the said one. Our work is a complete numerical work; however that work uses some of their analytic formulas in their programming. Also there is a big difference between our modeling of the collision in the "separation phase" and that paper.

This is added to the paper

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

More information provided in the paper.

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

That is a good point. The friction force in the horizontal direction exists. However, its amount is in the order of the Normal force. We estimated the amount of strike that this force makes in the very short collision time(in the order of 0.5 miliseconds).

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

Several models for collision were assumed and compared with the experimental data. This was the most accurate model. All the data and graphs are derived from original work which has never been modified to get a better match with experimental data.

Reviewer 3:

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.

The videos for three experiments, along with pictures from the experiments and MATLAB scripts both for video analyzing and for simulation are put in

http://tami-co.com/index.php?option=com_content&view=article&id=44&Itemid=5

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

In the file in supplementary file, there is a text file named “HELP.txt” in codes folder. You would follow the instructions there to use the programs.

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)?

It is now explained in the paper.

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

It is now explained in the paper.

Consider explaining the novelty of the project in the conclusions.

Added to the paper.

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

This was the best model we could have. And it is physically correct with some approximation. More information is added in the paper.

Again I thank the reviewers and editors for reading and reviewing the manuscript, and I hope this response has been acceptable.

Regards,

Alireza Tahmaseb Zadeh