Magnetic motor (magnetic path)

Description

Original project by Felipe Rodriguez for a permanent magnet machine. Computer simulations show that it is able to run. This machine is based on theory of TOMI tracks.

Presented by K Pullo, Jan. 21, 2005

Introduction

The making of a PERPETUAL MOTION MACHINE has always been a fantastic dream. There are many attempts along history, but always the same ending: PERPETUAL MOTION continues being a legend.

On another hand, the amazing properties of magnetic materials have always astonished boys and intuitive men. They can see a mysterious secret inside these materials. I think these properties are not being used properly enough yet...

Here is the last attempt.

The beginning

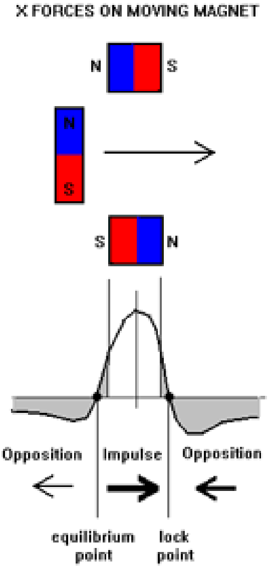
Some time ago I found a fantastic program called FEMM: http://femm.berlios.de/ This program makes analysis of all parameter types on magnetic systems, so I decided to analyze all the configurations of magnetic systems in the JLN LABS magnetic motors research.

I found that some systems definitively didn\'t work, others were difficult to repeat, and a few others contained good ideas.

Then I found the Stewart Harris TOMI theory: www.fortunecity.com/greenfield/bp/16/magnetic.htm

Then, I decided to analyze the system, and see the force profile on the MOVING MAGNET:

Let\'s begin with the picture below:



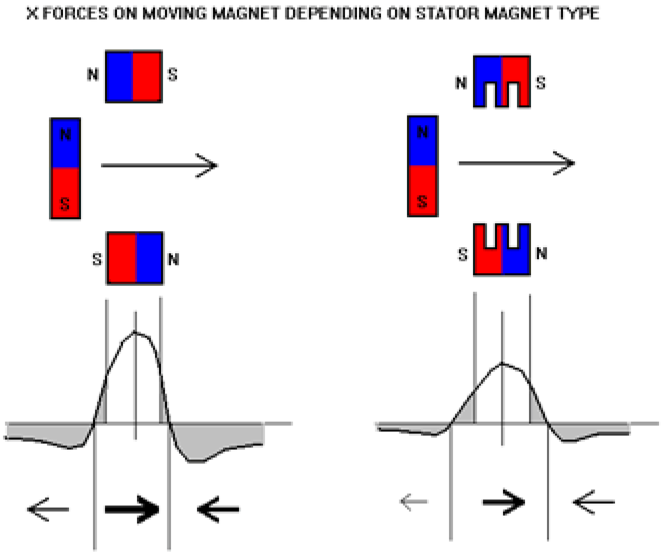
The MOVING MAGNET is 12 x 3 cms. The picture shows us the scheme of forces the MOVING MAGNET will suffer:

1 - As the MOVING MAGNET approaches, it feels a greater opposition force.
2 - Once the MOVING MAGNET is near the STATOR MAGNET, this opposition force decreases.
3 - While the MOVING MAGNET moves between the STATOR MAGNET, the force changes and impulses the MOVING MAGNET to the middle part of the STATOR MAGNET.
4 - Then, the impulse force goes decreasing, and near the end of STATOR MAGNET, it turns to opposite force again.
5 - This force goes decreasing too as the MOVING MAGNET goes far away from the STATOR MAGNET.

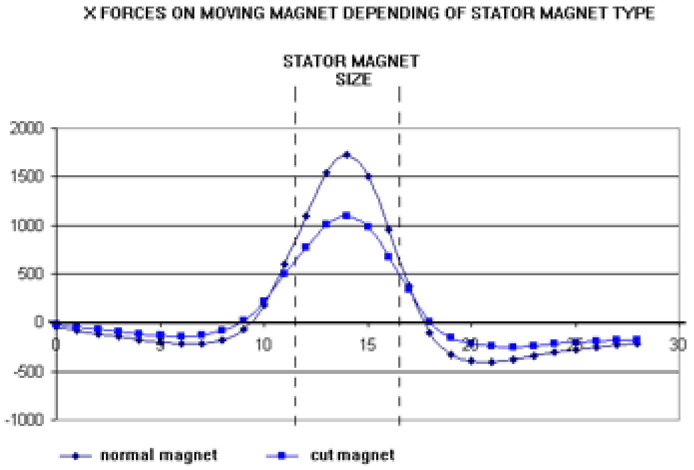
We\'ve got three regions of forces, and two interesting points:

1 - Low repulsion force as the MOVING MAGNET approaches, on a large region before the STATOR MAGNET.
2 - An equilibrium point, where the MOVING MAGNET can approach or move away from the STATOR MAGNET.
3 - An IMPULSE REGION, similar to the length of the STATOR MAGNET (THIS REGION WILL BECOME VERY IMPORTANT).
4 - A lock point, where the forces of impulse and repulsion are equal (that\'s what I call a \'hole\').
5 - A long opposition region as the MOVING MAGNET moves away from the STATOR MAGNET.

Now, I compare these forces with the forces obtained with the Stewart Harris TOMI TRACK:



Then, looking at the results, the only effect I see when I simulate the TOMI TRACK system is a \'relaxation\' of the forces along the X axis. It doesn\'t matter how long the cut magnet is, the effect is always the same. The IMPULSE REGION increases and the force amplitude decreases, but the graphical output is similar. You can see it here:

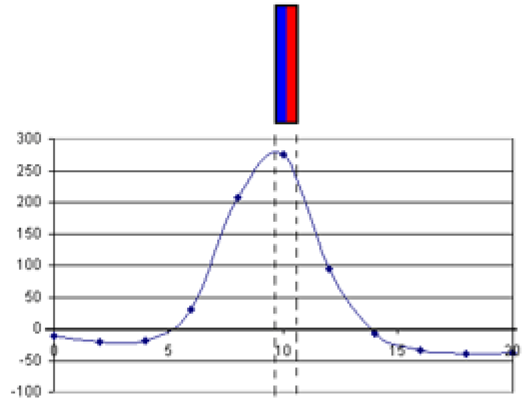


The force\'s magnitude decreases, and the spatial positions of equilibrium and lock points move away from the STATOR MAGNET, so the impulse force region becomes longer. The TOMI configuration gave me the idea of making the STATOR MAGNET smaller to get a maximum \'relaxation\' effect.

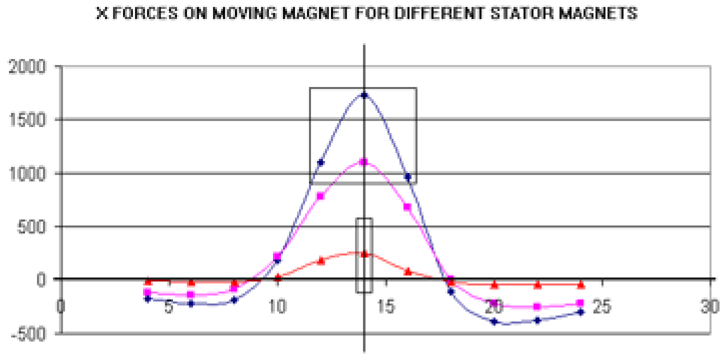
I don\'t know if there is another \'real\' effect I can\'t see.

But there is no strange theory from here to the end, all the following data are based on classical magnetism!

I probed with 6x1 cm STATOR MAGNET:



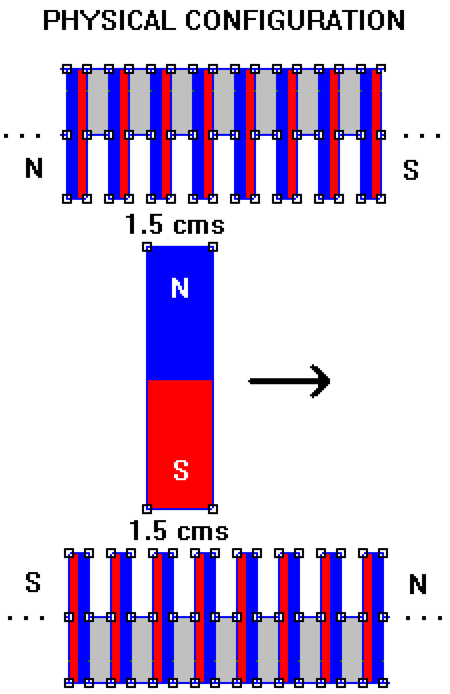
Now, we\'ve got a good STATOR MAGNET, that impulses the MOVING MAGNET 5 cm before, and 4 cm after the poles. You can see the comparison between different STATOR MAGNETS dimensions and forms:



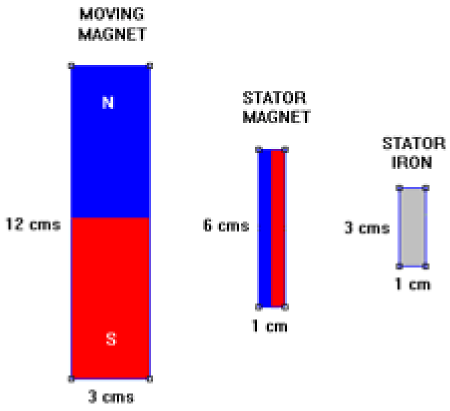
The physical device

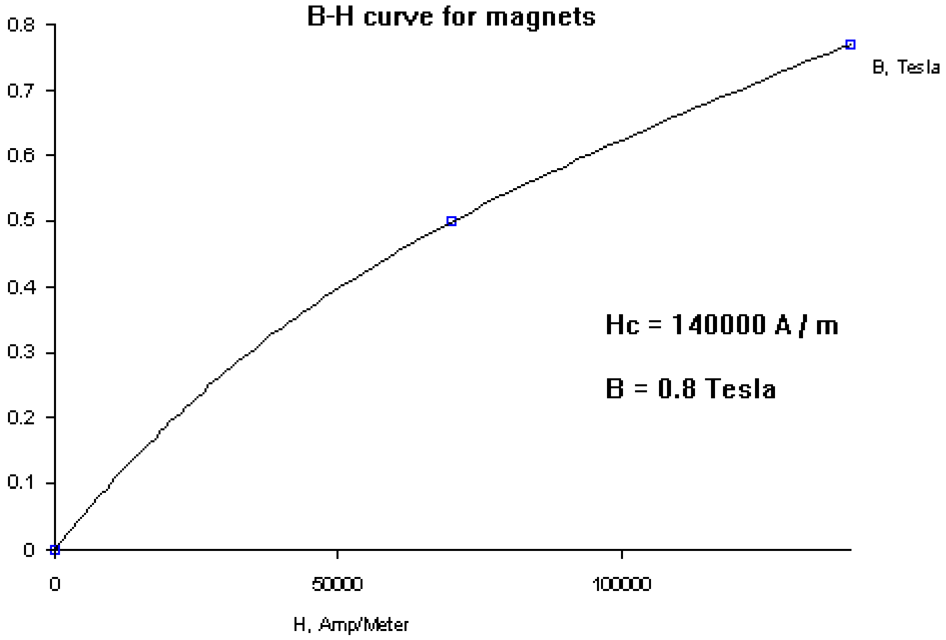
We present a system to get an unidirectional magnetic force on a MOVING MAGNET with no back opposition at any moment from a combination of STATOR MAGNETS on a TRACK... and this TRACK can be a closed loop too!

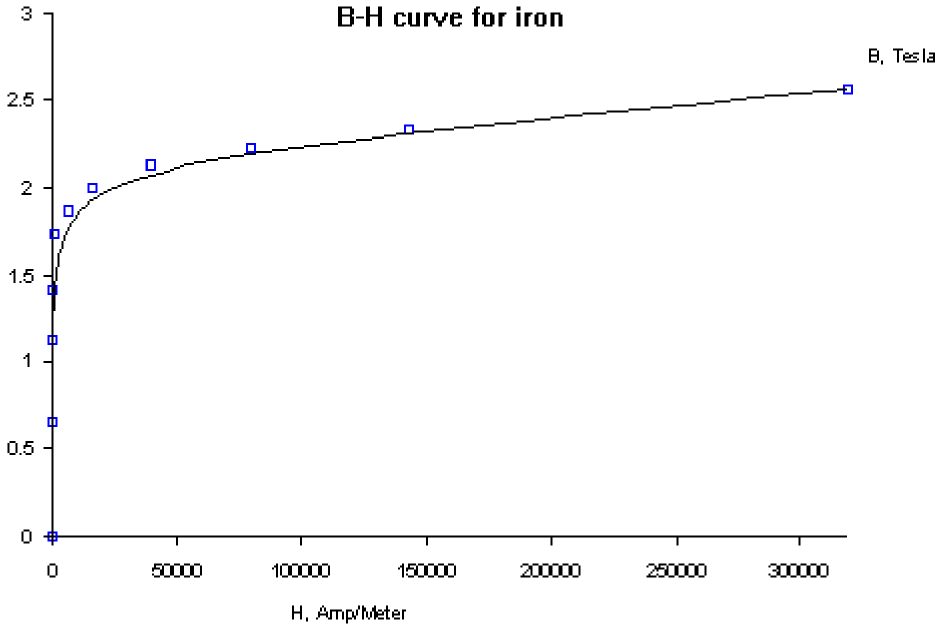
The system is presented on the next diagram:



The materials and physical dimensions used to do the simulation are presented below:







This doesn\'t mean that another configuration doesn\'t work better, but THIS ONE DOES!

Usually, the MOVING MAGNET goes only to the lock point of the orthogonal STATOR MAGNET, where the forces of one side and the other one are equal and opposite. The MOVING MAGNET finds a \'hole\' and we can\'t move it without applying external energy. Also, remember the opposition when the MOVING MAGNET approaches.

As we saw before, each STATOR MAGNET has an IMPULSE REGION that is bigger than the STATOR MAGNET itself. Now, making a TRACK of such STATOR MAGNETS, the MOVING MAGNET can pass from one STATOR to another.

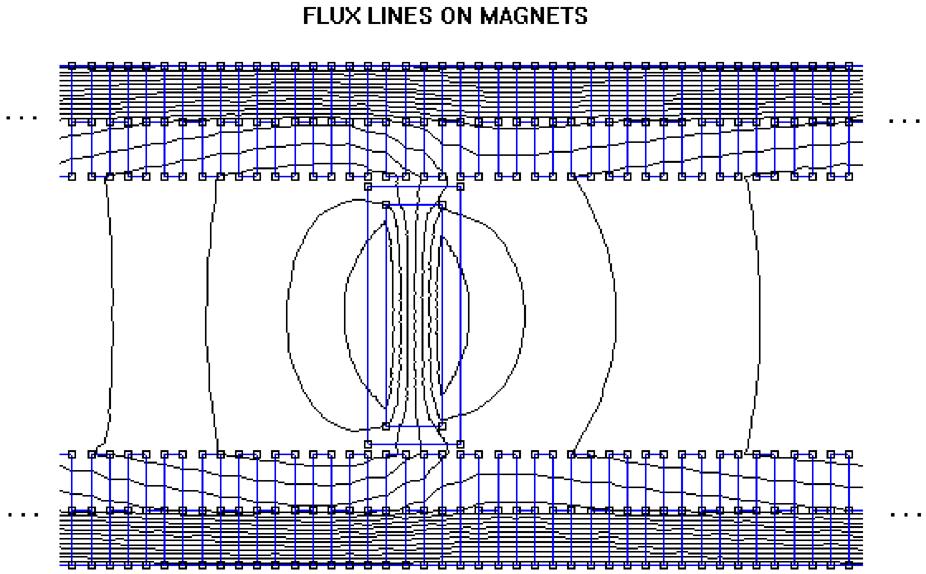
The physical principle

The flux lines on STATOR MAGNETS on a TRACK make a closed loop. They pass from one STATOR to the next one through the iron. When the MOVING MAGNET pass near a STATOR, it \'gets\' some flux lines, and this allows the force to be as we explained before.

As the MOVING MAGNET goes along the TRACK, it passes from the influence of one STATOR to another. The trick happens when this INFLUENCE REGION is smaller than the IMPULSE REGION of STATOR MAGNETS, then the MOVING MAGNET will move with no opposition, because there are no lock points, only successive IMPULSE REGIONS!

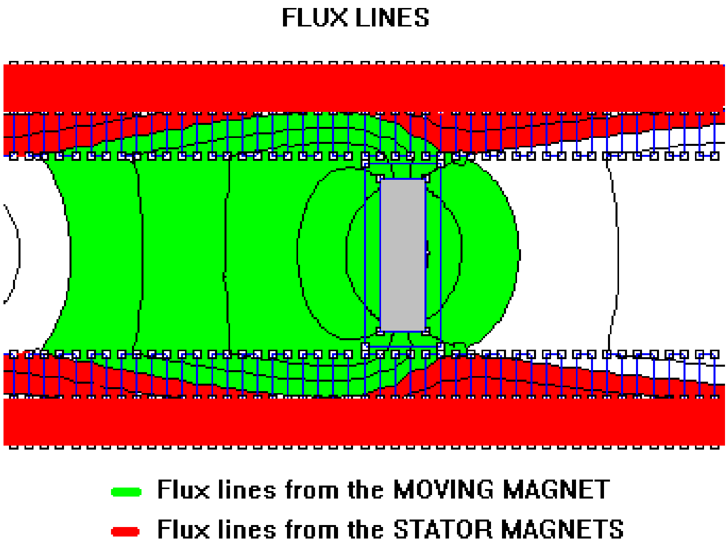
The flux lines

The flux lines on the MOVING MAGNET when it moves along the TRACK are like these ones:



You can see that the influence of each STATOR MAGNET is about 2 cms at each STATOR MAGNET\'s side, and the IMPULSE REGION is 4 or 5 cms as we said before.

Here are the flux lines pertaining to the MOVING MAGNET and the STATOR MAGNETS:

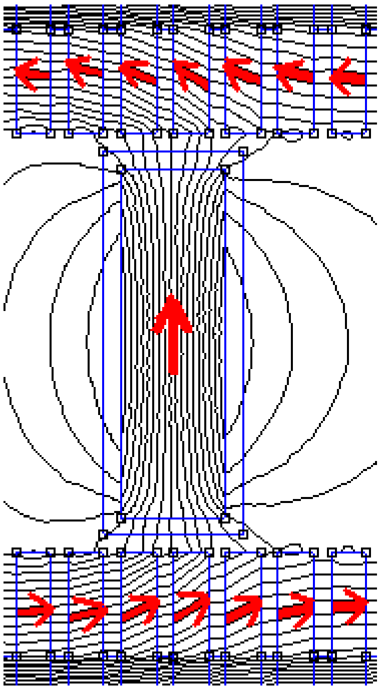


The flux lines from the MOVING MAGNET are not equally distributed along the TRACK.

Usually, on other TRACK perpetual motion machines, the field to get the unidirectional force is set up without the MOVING MAGNET inside, so when they put the MOVING MAGNET inside, it changes the flux lines, and no unidirectional force is extracted. These TRACKS have parts of attraction and parts of repulsion when the MOVING MAGNET is inside. In this device, the concept is the other way round. You\'ve got a field that looks to do nothing, but when you put the MOVING MAGNET inside, the flux lines changes in such a way that there is a force of the same direction on every position of the TRACK.

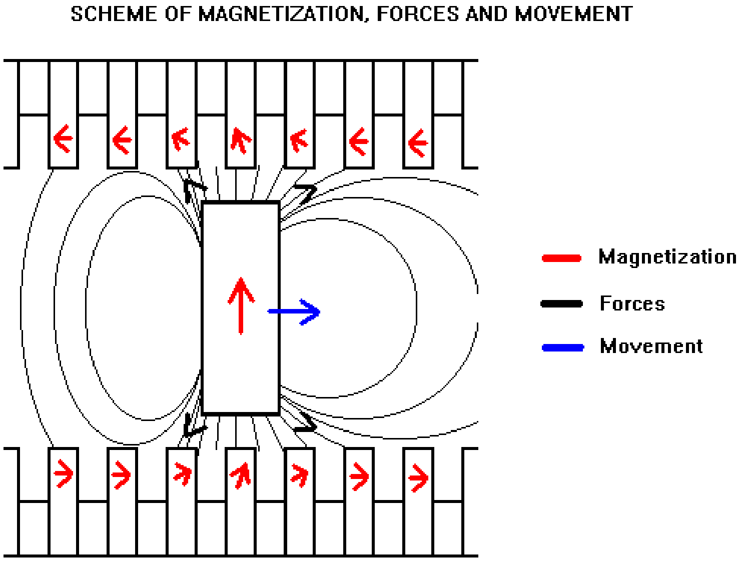
The magnetization effect

Take a look at this picture to see how the MOVING MAGNET changes the direction of the flux lines inside the STATOR MAGNETS:



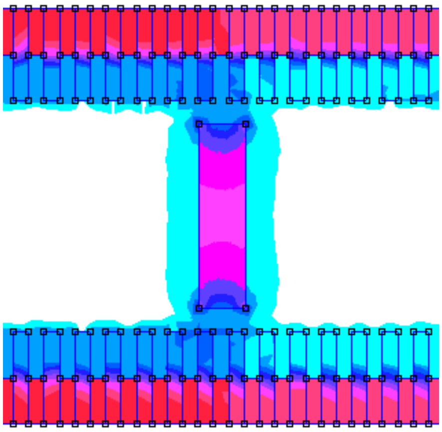
As you can see, the presence of the MOVING MAGNET changes the magnetization direction on smaller STATOR MAGNETS. This change is more evident in front of the moving magnet than behind it due to the configuration of STATOR MAGNETS fields. The STATOR MAGNETS can\'t move, so the flux lines are more axially directed in front of the MOVING MAGNET. Maybe the forces magnitude is the same, but the X component is always greater in front of the MOVING MAGNET.

Here you\'ve got an example:



The flux density

The flux density on STATOR MAGNETS behind the MOVING MAGNET is higher than ahead:



And you can see how this flux density follows the scheme of the flux lines. The highest density is behind the MOVING MAGNET, but inside the STATOR MAGNETS, and there is also a little part of high density ahead the MOVING MAGNET edges.a

The final explanation: energy difference

At the present moment, we have seen a lot of effects produced on flux lines, flux density and magnetization on magnets due to the configuration and materials of the device. All these things claim the generation of a unidirectional force. Here is the more powerful argument: ENERGY.

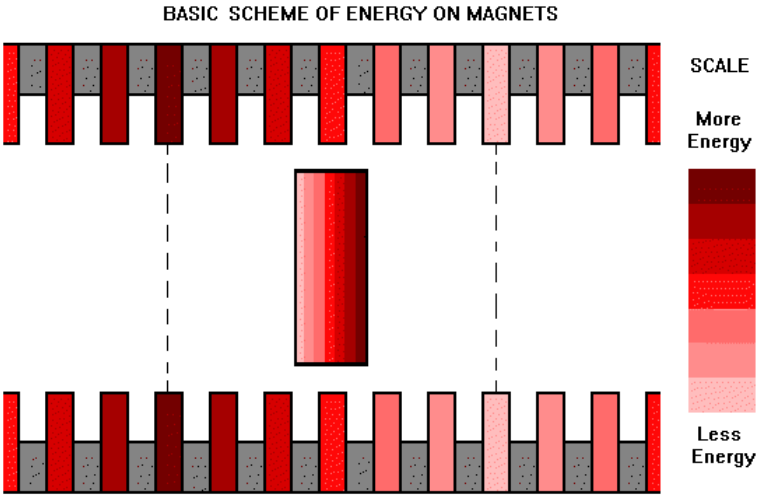
The MOVING MAGNET has not a symmetrically distributed energy, and it doesn\'t matter where the MOVING MAGNET is respect to the TRACK!

Usually, the magnetic energy on a magnet is equal from the middle to both sides. The energy is equally distributed along the magnet, so it doesn\'t move. When you place a STATOR MAGNET near one side, the energy level of this side increases or decreases, and the moving magnet approaches or moves away. Also, the STATOR MAGNET feels the opposite force, but it is cancelled by mechanical tension, so the STATOR MAGNET doesn\'t move.

On the PM3, the magnetic energy levels on MOVING MAGNET are ALWAYS different on both sides. The simulations gave 19.5 Joules / m from the middle to the left and 22.3 Joules / m from the middle to the right, with little variations while the MOVING MAGNET moves, but always a difference of 2.8 Joules / m approx. is maintained.

The magnetic energy on MOVING MAGNET is always less from the middle to the left than from the middle to the right (whatever the position respect to the TRACK is), so a force is generated. Also, the STATOR MAGNETS near the MOVING MAGNET have different energy levels too (more on the left STATORS than on the right!), but the forces generated on near STATOR MAGNETS are compensated with mechanical tension forces as explained before.

Here is a simple graphical explanation of energy distribution:

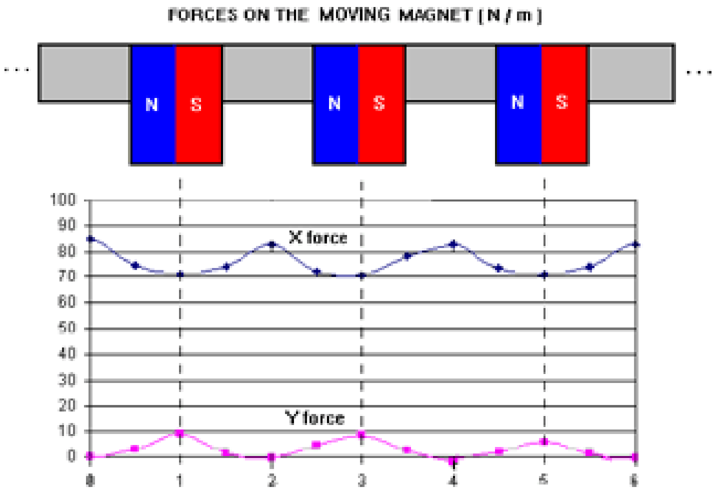


Due to this difference on energy distribution (greater on the right side), the MOVING MAGNET feels a force and the near STATOR MAGNETS feel the opposite reaction (energy levels on near STATOR MAGNETS increase to the left).

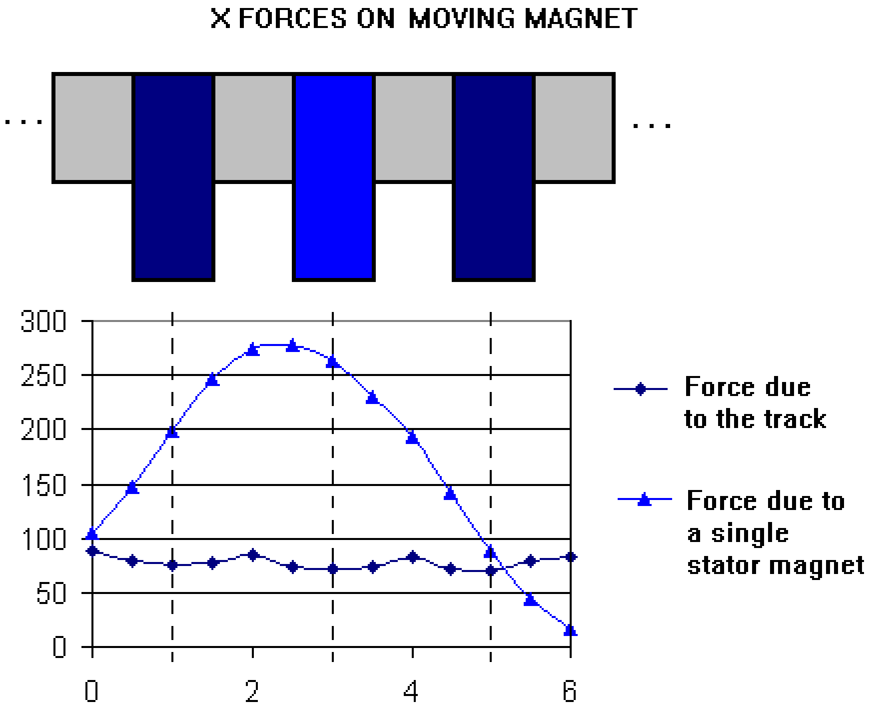
The energy distribution takes this configuration because of the presence of the MOVING MAGNET between the STATOR MAGNETS, so it doesn\'t matter where we put the MOVING MAGNET, it will change the energy distribution around, so the position of the magnet causes the energy distribution to change and that energy distribution makes the MOVING MAGNET to move.

The forces measured on the device

Here is a graphical measurement of the forces along the path of MOVING MAGNET that confirms the motion:

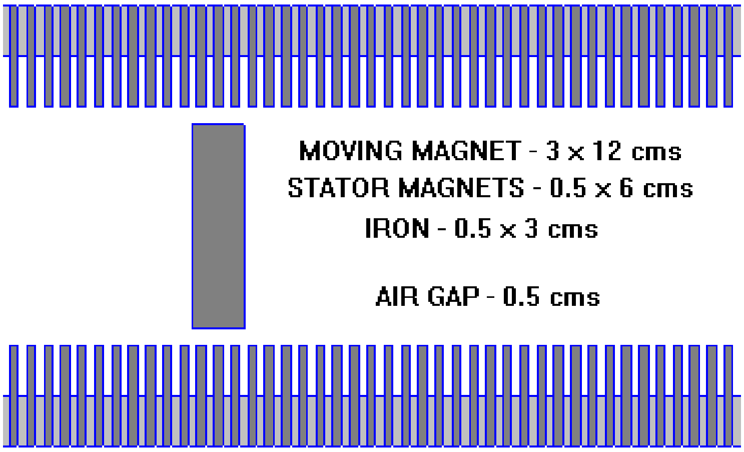


As you can see, there is no opposition or neutral point along the path. The medium force is about 80 N*m in this configuration. Here is a comparison between the effect of a STATOR MAGNET and all the TRACK:



You can notice that INFLUENCE REGION is smaller than IMPULSE REGION as said before, so the total force is always positive on X axis.

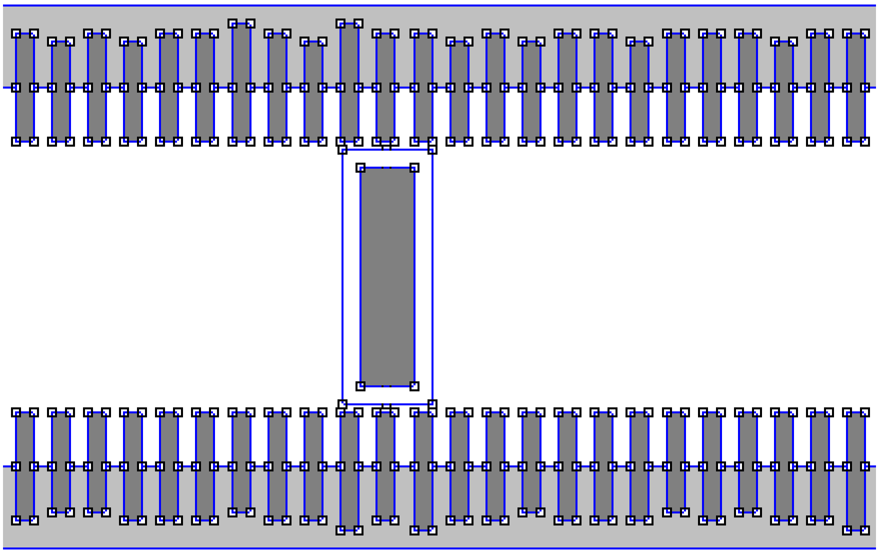
The device works better when the MOVING MAGNET is close to the TRACK (but the Y force variations increase) and when the STATOR MAGNETS are thinner, because more of them affect the MOVING MAGNET and then the X force is more regular:



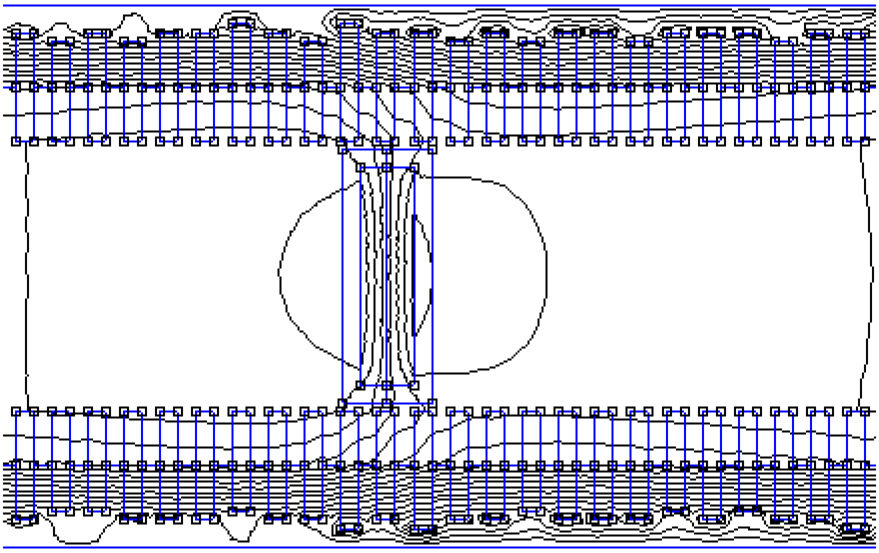
Variations on stator magnets

Due to the great number of equal STATOR MAGNETS needed, you could think the system is very difficult to \'tune\'. The following simulation confirms that variations on magnets field affects only efficiency, not working principle. The system is robust to STATOR MAGNETS variation.

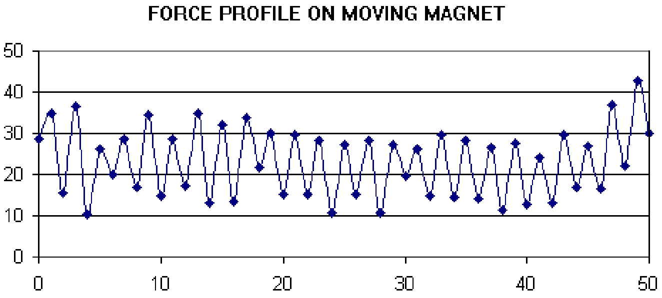
Let\'s see a configuration of STATOR MAGNETS of different sizes, to simulate different B fields. The variations are about 20% on Y size:



The flux lines are like these ones:



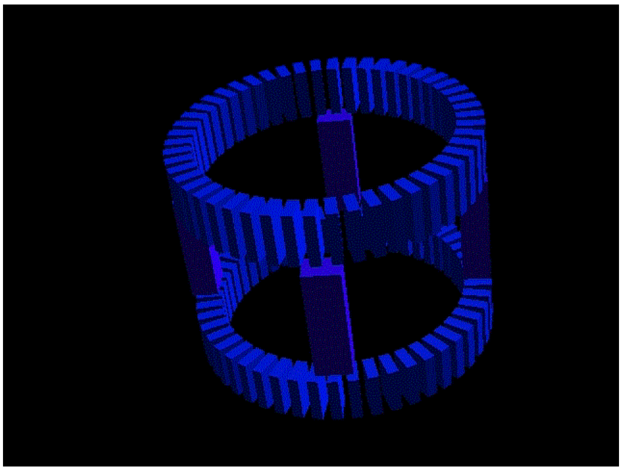
In this case, some flux lines are lost inside the iron between the STATOR MAGNETS, because they have different B field values. This causes a decreasing field density, and an increase on the variation of energy as the MOVING MAGNET moves:



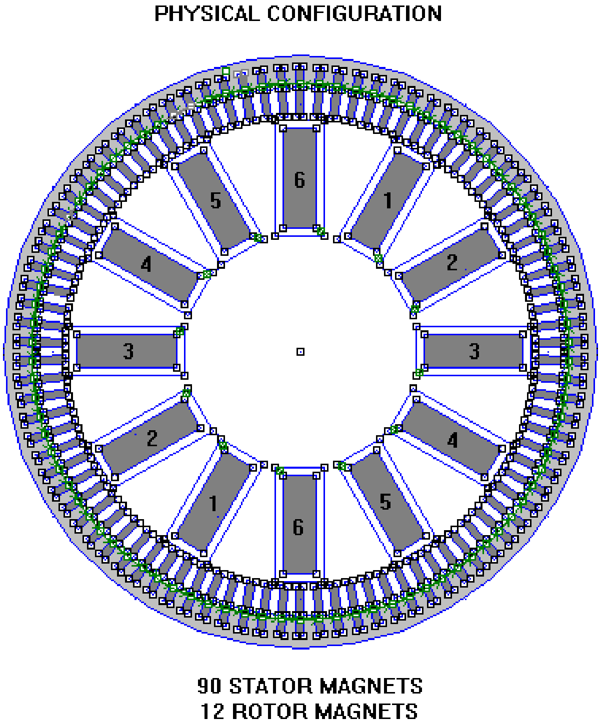
The force magnitude decreases and has an irregular profile, but it\'s always directed to impulse the MOVING MAGNET on the right direction.

Closing the loop

I think all the process is based on a local effect between the MOVING MAGNET and the TRACK of STATOR MAGNETS, so a closed loop must work too:



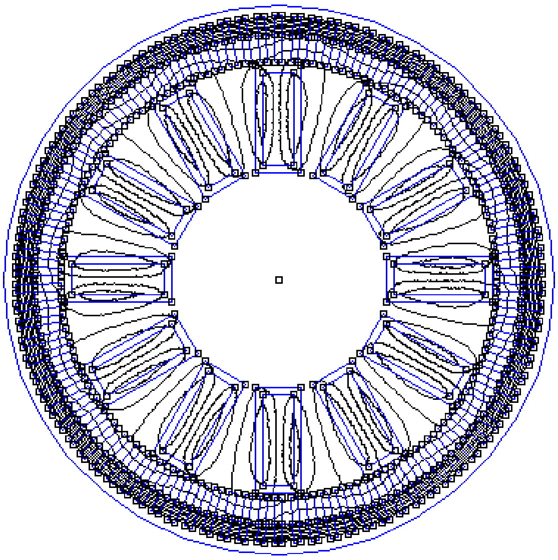
To demonstrate this fact, let\'s do a closed loop like this one:



In this case, each MOVING MAGNET has a different position in respect of the STATOR MAGNETS, so the total torque must be zero if the additive effects of each MOVING MAGNET compensate.

The flux lines inside the magnets are like these ones:

FLUX LINES CONFIGURATION

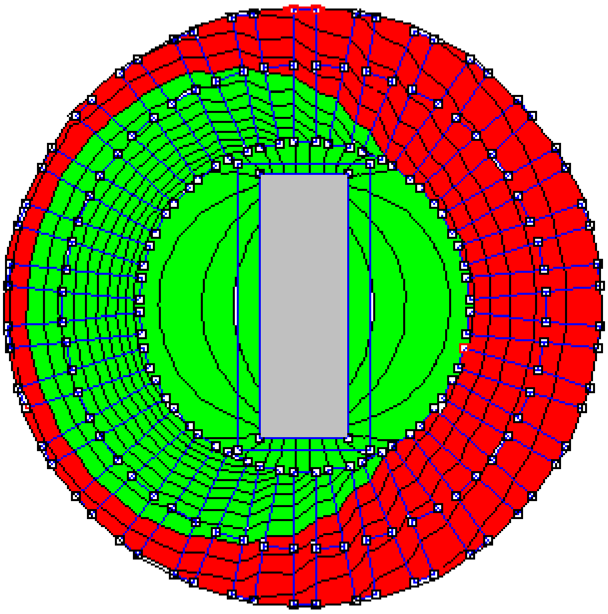


The energy on STATOR MAGNETS increase clockwise near the MOVING MAGNETS and anti-clockwise on all MOVING MAGNETS and STATOR MAGNETS when no MOVING MAGNET is in between.

Let\'s see the torque (N*m/m) on each arm of this \'clock\' of MOVING MAGNETS: arm 1: 13.71 arm 2: 26.58 arm 3: 12.67 arm 4: 30.32 arm 5: 8.811 arm 6: 29.52

The torque about 0,0 may be near to zero if the system doesn\'t work, but as you can see, the STATOR MAGNETS always give some positive torque to the MOVING MAGNETS, so the rotor can turn without any other energy to apply!

As an example of the working of this device, imagine the same closed loop, but with only one MOVING MAGNET in between, like this:



The flux lines of the MOVING MAGNET and the STATOR MAGNETS are shown separately.

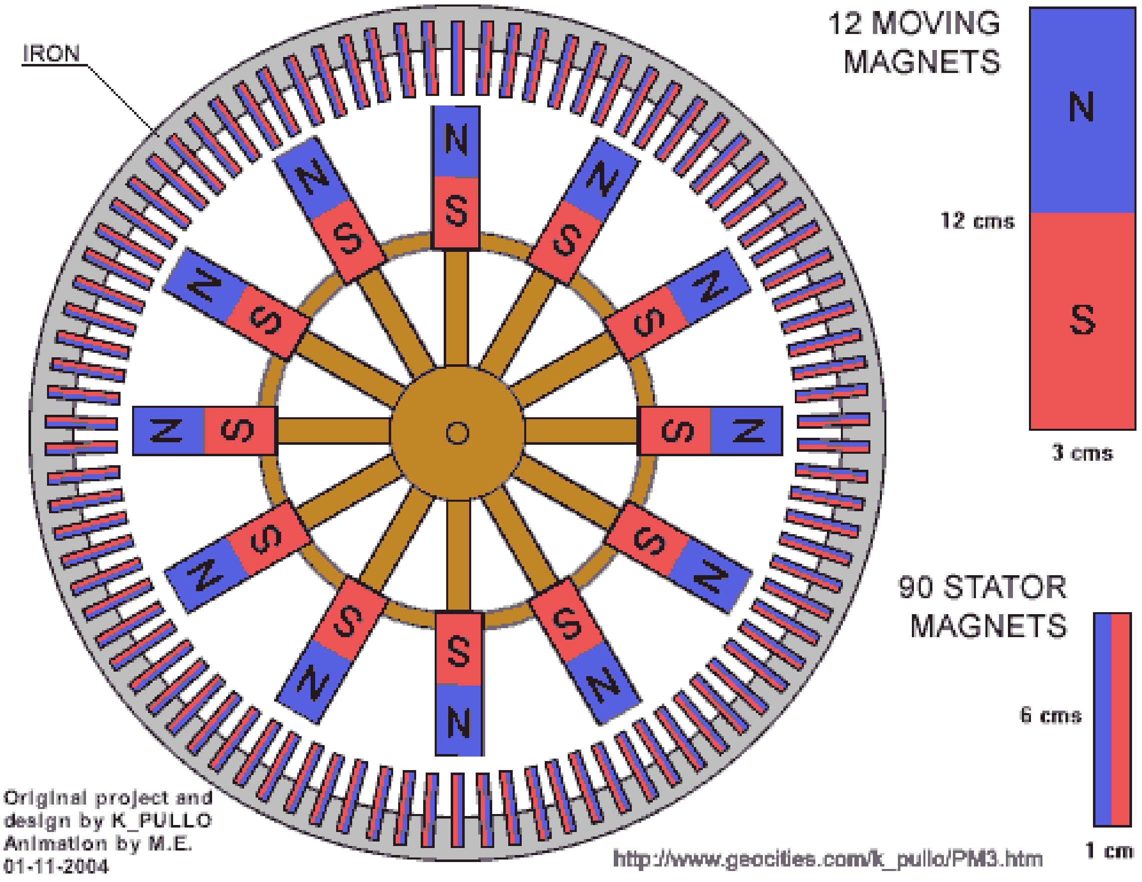
Do you think the MOVING MAGNET will remain quiet?... I do not. I think the MOVING MAGNET will feel a force to the right on both edges (not a torque because of the single MOVING MAGNET configuration) because of the energy difference from one side to the other (22.87 J / m and 22.91 J / m). It obviously will stop when touching the STATOR MAGNETS, but the force it will feel is of the same nature of the one previously exposed in this paper. A lot of different device configurations can be made to get unidirectional forces or torques as you want.

Conclusion

You can probe these measurements, improve the system or demonstrate that it\'s wrong...

...Also, you can \'really\' construct it, and \'in principle\' get the energy of a motor forever and for free!...

To make any comments, you can send me an e-mail: *mailto:k_pullo@yahoo.es*

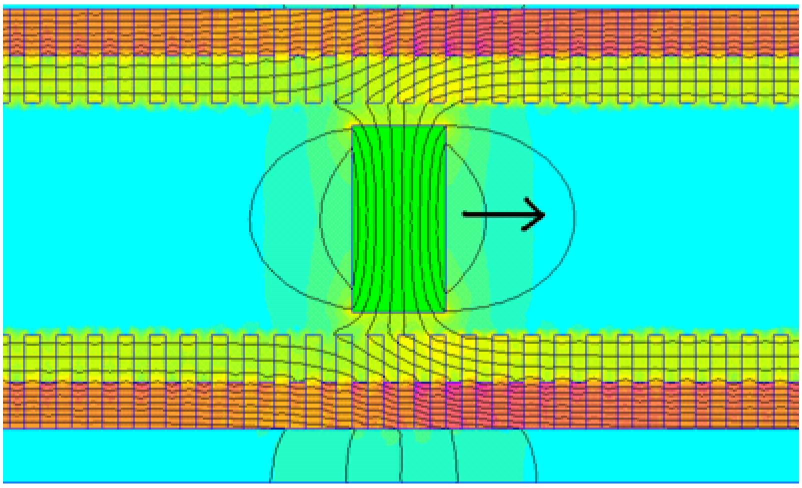


Original project and
design by K_PULLO
Animation by M.E.
01-11-2004

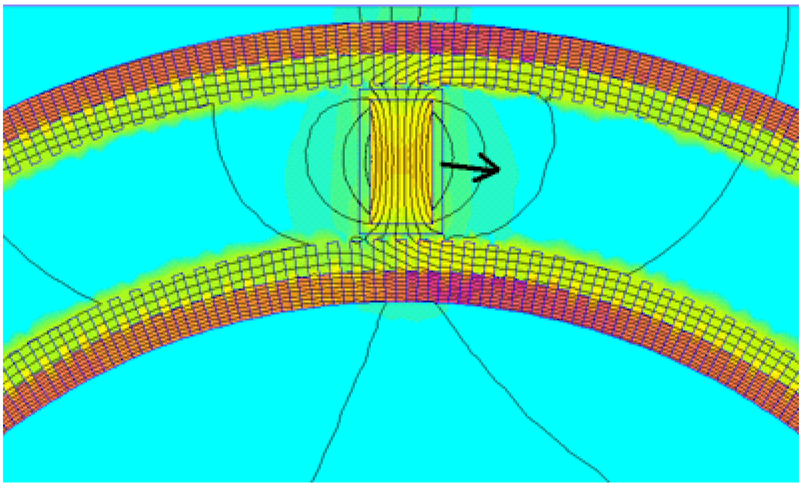
http://www.geocities.com/k_pullo/PM3.htm

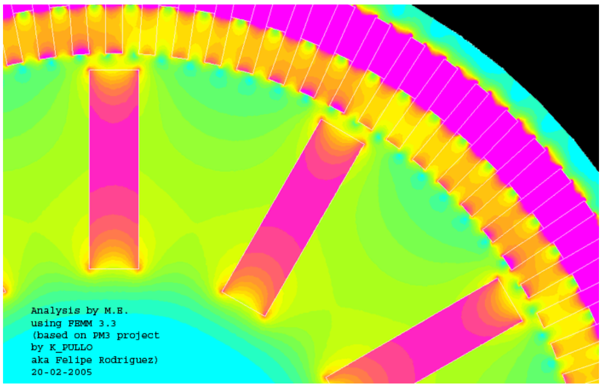
Computer simulations

Linear TOMI track, which is proven to work:

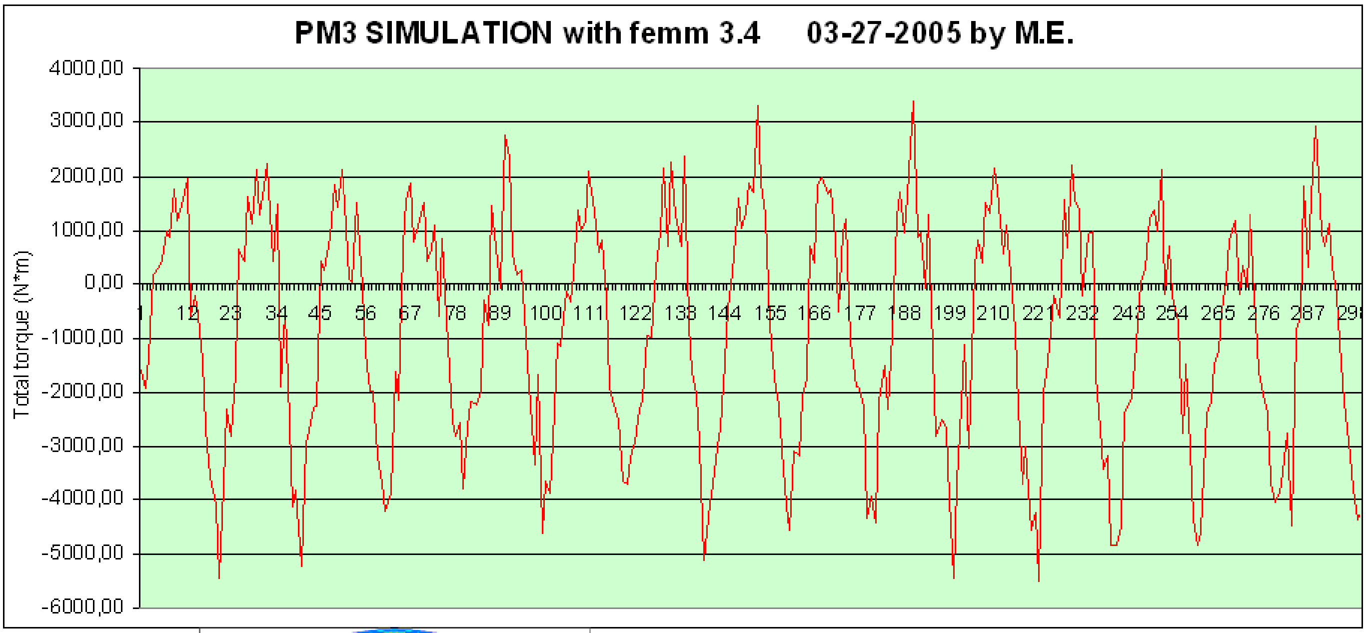


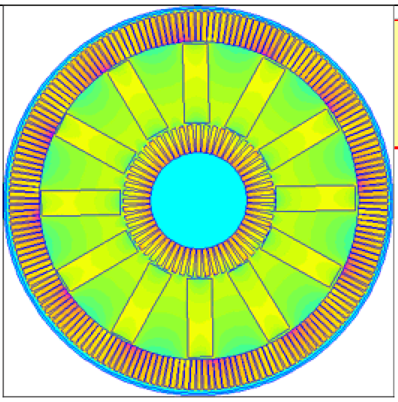
Curved TOMI track, the working principle is the same. If a complete circular track is created, the magnet should continue to move:





Computer simulation using femm 3.4. It shows a torque different from zero:





Average torque: -858,385

X-axis scale: 1 unit=0.1 degree

PS

When in reality, the magnet does not want to run on the track, then why not let a closed path which is repelled by a magnet.