

ADVANCED PHYSICS CLUB

JANUARY 27, 2019

TODAY'S MEETING

The topic of today's meeting was hydrodynamics. We derived the Bernoulli's principle and applied it to several physics problems.

DISCUSSED PROBLEMS

1. An open cylindrical container is standing on a flat table. It is filled with water (of density ρ) so that the depth of water is H . A small hole is drilled in the side of the container, at a height h from the bottom. At what speed is water exiting the cylinder? At what height should we drill the hole to maximize the distance between the cylinder and where the water stream hits the table?
2. A flat stream of water of thickness h is falling onto a plane at an angle α with speed v , as shown in Figure 1. What is the ratio of the amounts of water going to the left and to the right after the stream splits? Neglect dissipative forces and gravity.

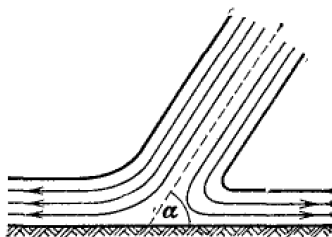


FIGURE 1.

HOMEWORK

1. A bucket with water is suspended on a string. How does the tension of the string change if one opens a small opening of area A in the bottom of the bucket? The density of water is ρ and the depth of the water in the bucket is h .
2. Let's go back to the first problem we discussed in the class and imagine drilling many small holes in a vertical line on the side of the cylindrical container all the way from the top to bottom. Determine the shape of the envelope of all the streams in the limit where the spacing between the holes goes to zero.

AND NOW FOR SOMETHING COMPLETELY DIFFERENT

Watch the following amazing video from 3Blue1Brown to learn an unexpected connection between Physics and Geometry. Elastic collisions compute π !

"The most unexpected answer to a counting puzzle"

Try to solve the puzzle without looking to the answer.

FOR THE NEXT MEETING

The next club's meeting is at 2:40pm, room P-131, on Sunday, **February 3**.