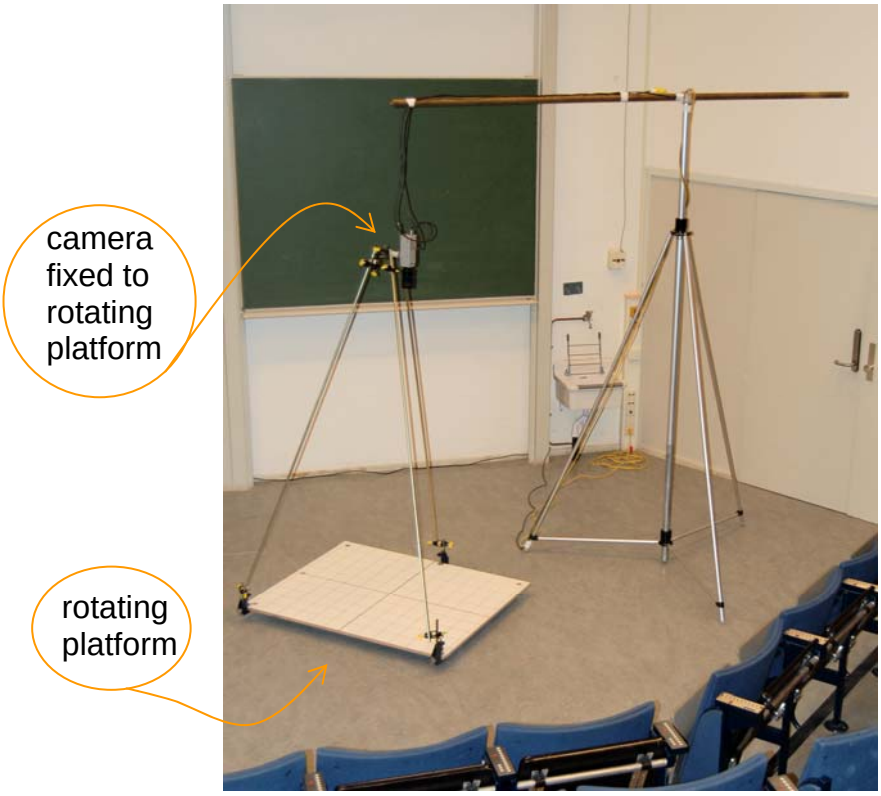
Coriolis (1b)

Aim: To show the effect on an object moving with constant velocity in a rotating reference frame.

Subjects: 1E20 (Rotating Reference Frames)
1E30 (Coriolis Effect)

Diagram:



Equipment:

- Rotating platform.
- Board, with square grid ($10 \times 10 cm^2$).
- Tripod with camera fixed to rotating platform.
- Large tripod to hold cables to the camera (see Diagram).
- Clamping material.

Safety:

- Take care not to make too many rotations into one direction, because then the cables to the camera twist too much..

Coriolis (1b)

Presentation: This demonstration is equal to “Coriolis 1a” in this database. The difference is that now the camera presents directly to the audience what is observed on the rotating platform.
Again show that the steel ball follows a straight line in the lecturehall’s frame of reference, while the camera shows a curved path.
Rotate the platform in both directions.

Explanation: $\vec{F}_{cor}$ $\vec{F}_{cor} = 2m(\vec{v}' \times \vec{\omega})$. $\vec{v}'$ and $\vec{\omega}$ are continuously perpendicular to each other. Figure 1 shows

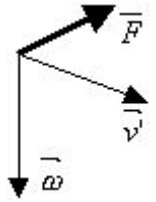


Figure 1

the direction of the resulting F_{cor} . So F_{cor} points as seen from $\vec{v}'$ continuously to the left, giving m a counter clockwise path.

When the platform rotates into the other direction, in Figure 1 $\vec{\omega}$ will point upward and the resulting $\vec{F}_{cor}$ will be the opposite direction.

Sources:

- Mansfield, M and O'Sullivan, C., Understanding physics, pag. 182
- McComb,W.D., Dynamics and Relativity, pag. 137-145
- Roest, R., Inleiding Mechanica, pag. 197-202, 205-210