

# Force field

Aim: To introduce the concept of a (radial) force field.  
Subjects: 1D50 (Central Forces)  
Diagram:



Equipment:

- Large glass bowl on overhead projector.
- Screen to hide the bowl.
- Steel ball.

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Presentation: The steel ball is held out of the centre of the bowl and released. Then the overhead projector is switched on and the image of steel ball is projected on the screen. The spectators see the ball move in a line from one side to the other, just like there is some spring that is continuously pulling the steel ball to a centre. The line may rotate slowly in a plane, but all the time we can describe this movement as being caused by a force that is always directed towards a centre (see Figure1).

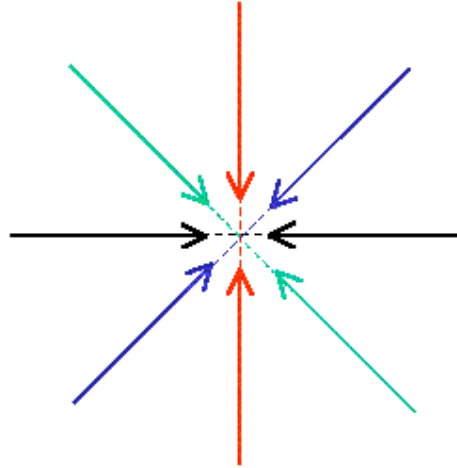


Figure 1

Also when the ball is given a movement perpendicular to the force field, the effect of the force field on the movement can be observed (circular - and elliptical orbits). When the movement is circular, it is just like there is a piece of rope connected to the centre.

When the movement is elliptical the ellipse also shows a precession, indicating that the force field is not a real inverse square force field (see also the demonstration "Precessing orbit" in this database).

Remarks:

- The screen to hide the bowl is placed to prevent students to "see" the vertical field of gravitation.

Sources:

- [Ehrlich, R., Why Toast Lands Jelly-Side Down: Zen and the Art of Physics Demonstrations](#), pag. 66-68
- [Mansfield, M and O'Sullivan, C., Understanding physics](#), pag. 83-84 and 107-108
- [McComb, W.D., Dynamics and Relativity](#), pag. 50