

Pop Physics

An exploration of physics in popular culture.

Bob Somers

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4th Class Period

Inertia



(Screenshot of upcoming game Half-Life 2)

The physics in this example comes directly out of the highly anticipated PC game Half-Life 2. The exact level and location information from the above screenshot is unknown. The game is due to be released November 16 and Valve, the game's developer, is very hush-hush about plots and game information. However, the screenshot above is an excellent example of the game's groundbreaking physics engine.

The physics in this example consists of the force field (yes, unrealistic characters but very realistic physics) pulling a security guard from his standing position. The sudden jerk backwards causes his torso to fly backwards but his arms and legs flail out in front of him. This is physics at work.

Due to inertia, his appendages want to continue what they've been doing, which is hanging at rest in space. They continue to try to do this even though his torso is yanked backwards. This is the brilliance of the new physics engine in the game. The physics of every object is calculated based on the forces acting upon it and each object responds as it would in the real world.

Acceleration



(A Blue Devils trumpet player accelerates to his next spot.)

Drum corps compete all summer long performing their field shows all across the nation. These shows are made up of not only music, but also quick and precise drill movements that require a lot of running around. Each show is made up of a series of drill moves performed in seamless sequence.

During exceptionally quick drill maneuvers, musicians may be required to accelerate quickly to their spot or decelerate very rapidly. This is especially the case where a performer must march with a very large step size to make one move and immediately convert to a smaller step size to avoid hitting his next point too early. This rapid acceleration and deceleration has to be completely controlled by the musician.

This is physics at its finest. It's completely real and concrete physics. There's nothing to dispute because real people perform these maneuvers in their field shows wow audiences with their quick and precise execution.

Gravitational Force



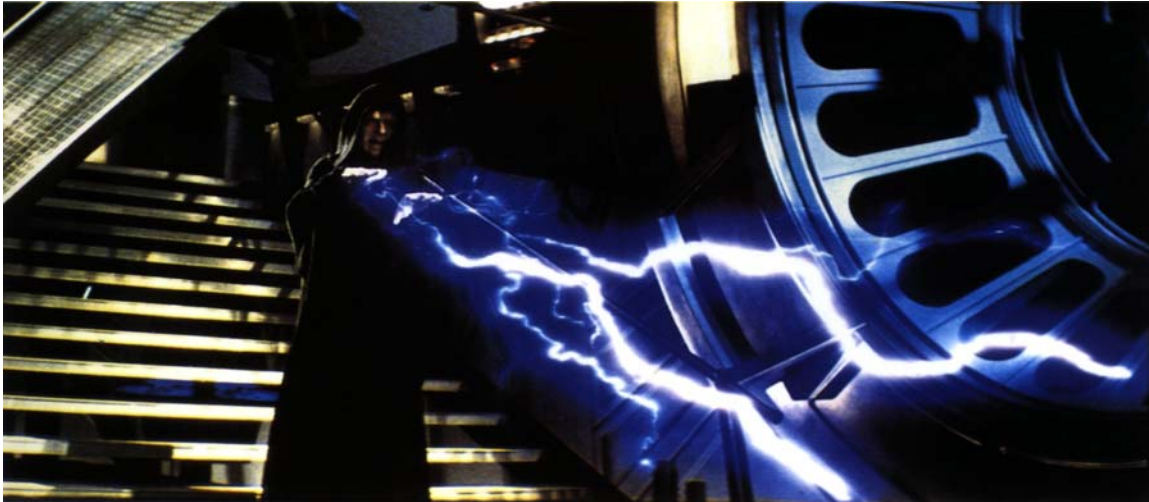
(A scene from The Matrix Reloaded)

Although physics is defied pretty uniformly throughout *The Matrix Reloaded* this particular scene is blatantly not possible. When Neo engages in his fight with Agent Smith, he comes to a point where he spins around in a circle using a large pole and continues to kick clone after clone of Agent Smith.

In this case we would expect the force of gravity to slowly pull Neo downward as he travels around in circles. No matter how fast his horizontal component is, his vertical component of gravitation force pulling down operates independently.

The problem with this scene is that Neo never slides or sinks down toward the ground at all. He continues to spin around the pole for multiple revolutions and several seconds without budging an inch downward. It seems to be suggested that the speed of his horizontal component holds up his vertical component. However, as we know this statement is not true at all in physics.

Force Diagram



(The Emperor uses the force to fry Luke Skywalker to a crisp.)

In physics we use force diagrams to keep track of all the forces that we have acting on an object in a problem. Fortunately these forces are all real-world forces that we can see the effects of right away. The force portrayed in *The Return of the Jedi*, the sixth episode in the Star Wars series, is shown throughout the movie to be an all-powerful force that can assist a Jedi in doing any task he pleases.

The physics of the force is difficult to explain because it covers so many areas. It can launch things into projectile motion, it can move things, it can fry people, etc. However, more importantly, the force can be utilized at the will of the people who wield it, not always following a set pattern of behavior (i.e. gravity pulls down, friction pulls in the opposite direction of motion, etc.)

The physics in this is clearly wrong. How are you to even begin drawing a force diagram when one of the key forces involved in the problem depends upon the whim of the Jedi wielding it? One problem at one time may yield one result, only to be invalidated later by a result that thwarted the actions of the Jedi for the first time.