

Investigating Navigation Using Smartphone Sensors

Marcela Izquierdo Poza '24, Cristina Llongueras '23

Peter Sheldon, Physics & Engineering

Inertial navigation has long been used for measurement of acceleration, speed,



position and orientation in commercial travel (boats, planes), but the systems are complicated and expensive. These systems are made up of devices called accelerometers and gyroscopes that may be enhanced by magnetometers, and altimeters. More commonly known for navigation, GPS is good for two-dimensional positioning on a surface, but not for orientation or altitude, and GPS

signals are not always available since they require communication with a system of satellites. Inertial navigation systems are self-contained and do not require communication with an outside agent. We have studied using affordable accelerometers and gyroscopes built into smartphones for inertial navigation in a long-term project on rollercoasters, and more recently as a replacement for standard introductory physics-lab equipment. Recently we found an exciting anomaly in the iPhone accelerometer that is not mentioned in the literature, which we propose to study in detail.

