

Electric Speed Drives Technology in Transportation (ESDTT)

Bruno Osorno
California State University Northridge
AIMS2 program

Summer 2017

Abstract:

Electric car sales increased by 50% in 2015, which surpassed the car (combustion engines) market sales by ten times. The components industry is also booming rapidly with components such as batteries, super capacitors, in wheel-systems, transmission and electric motors, and power electronics. There is a tendency to use electric speed drives with capacities from 5 to 15 KW for specific vehicles, such as golf carts, cargo vehicles, lifting vehicles and small shuttle buses. Permanent magnet synchronous motors (PMSM) and Induction Motors (IM) are the motors of choice for electric-drives. To put it in perspective of education, job market and state of the art technology, in 2013, 63 billion dollars were spent in electric motors alone and it is projected that 302 billion dollars will be spent by the year 2023. This trend is very important in terms of CO2 pollution and the environment as a whole. This project will introduce students to the speed-drive technologies with hands on laboratory experience. Arduino microcontrollers will be utilized to control Direct Current (DC) motors.

Students will learn fundamentals of power electronics, matlab/Simulink software, modeling of Induction Machines and PMSM, and Arduino programing.