

Car Stabilization System - Modelation of ESP

Ptacek, Martin

Automobile industry has always been one of the most significant indicators of the current technological development. In recent years regular cars were equipped with electronic and computing devices including stabilization systems that have led to a significant increase in safety driving. This experiment was performed to prove the feasibility of developing a functional stabilization system for a model car. The model car platform had to be modified and rebuilt in order to support necessary components including wheel velocity sensors, disc brakes and control units. The main control unit (a microcontroller Arduino DUE) was equipped with software enabling its cooperation with other functional elements of the platform. A microSD card turned up to be the more reliable and thus optimal solution for the sake of driving data analysis in comparison with the xBee wireless technology. Innovations in algorithms of wheel velocity calculation made proper data examination possible. At this point it was clear that the microcontroller would be able to analyze current driving situation using platform sensors. That means that in case of the driving situation being evaluated as dangerous the microcontroller takes control over the platform in order to regain stability. These intervention algorithms use basics of PID regulation to provide optimal performance. After careful testing the Anti-Skid Regulation system was made fully operational. The result of this project is a specialized model car platform equipped with devices allowing for stability research and systems development. The capabilities of this platform are represented by functional ASR system. This experiment may indicate possible development of stabilization in the near future - especially considering the trend of miniaturization.

Awards Won:

Third Award of \$1,000