

Development Of Multi-element Active Aerodynamics For The Formula SAE Car

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Abstract

This thesis focuses on the design, development, and implementation of an active aerodynamics system on 2013 Formula SAE car. The aerodynamics package itself consists of five element front and rear wings as well as an under body diffuser. Five element wings produce significant amounts of drag which is a compromise between the cornering ability of the car and the acceleration capability on straights. The active aerodynamics system allows for the wing angle of attack to dynamically change their configuration on track based on sensory data to optimize the wings for any given scenario. The wings are studied using computational fluid dynamics both in their maximum lift configuration as well as a minimum drag configuration. A control system is then developed using an electro mechanical actuation system to articulate the wings between these two states.

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