

Aim of this paper is to describe a research activity on the virtual prototyping, by means of the Reverse Engineering techniques, of an automotive semi-active differential based on the use of a Magneto-Rheological Fluid. The MRF allows to control the locking torque and consequently to improve the vehicle handling. Starting from the 3D digitizing and the virtual reconstruction of a gearbox of a common front wheel drive vehicle, the boundary volume of the new device (MRF LSD) was defined and a preliminary CAD model was realized. Then, optimizing its dimensions and choosing the adequate materials, the final virtual prototype was obtained. The successive GD&T phase allowed to get the best assembly procedure and quality of the final model of the new device. In order to evaluate the goodness of the virtual simulations realized and of the results proposed, a physical prototype was manufactured. Finally, several experimental tests were carried out to validate the design process.