Analysis Tool Generates Custom Vehicle Drive Cycles Based on Real-World Data

NREL’s DRIVE tool delivers precise and easy-to-interpret assessments in a fraction of the time.

Understanding duty cycles plays a fundamental role in assessing the performance of new vehicle technologies, leading to more informed decision making, better test procedures, more successful designs, and lower manufacturing and operating expenses.

NREL’s Matlab-based Drive-Cycle Rapid Investigation, Visualization and Evaluation (DRIVE) tool produces representative testable drive cycles at record speed from vehicle data gathered using onboard logging devices. Algorithms mimic the logic and expertise of a human engineer, cutting testing and analysis time by days or weeks, while establishing a repeatable process and making information accessible through a simple graphical user interface (GUI). Originally geared towards analysis of medium- and heavy-duty vehicle fleets, use of the tool has expanded to encompass the full range of vehicle types and sizes.

DRIVE helps manufacturers ensure designs are based on real-world usage, supplying information needed to perform vital development tasks, such as sizing electric motors in a hybrid vehicle configuration or optimizing battery storage in an electric vehicle. For researchers this information can lead to improved models and more precise experiment designs. For regulators, a better understanding of the way people drive can help guide policy regarding vehicle emissions and fuel economy test procedures.

NREL’s tool filters large sets of raw data, removing erroneous data points and repairing missing data sections, before performing analyses covering 168 unique vehicle drive cycle metrics. The program then generates shortened custom drive cycles from “ideal” sections of filtered data using specialized statistical clustering methods. In addition, the program compares filtered in-use data to a library of standard test cycles to find the best fit. Output results range from simple tabulated summary statistics to Google Earth route maps, providing information that has enough depth for scientific applications, but is accessible to users without technical backgrounds.

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References: