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# A new methodology to determine typical driving cycles for the design of vehicles power trains

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## Abstract

Driving cycles currently available cannot be used for the eco-design of vehicles power trains because those cycles do not describe local driving patterns. The main difficulty in obtaining a representative driving cycle is the lack of a repeatable and reproducible methodology to ensure that the resulting cycle is representative of local conditions. We developed a methodology to address this need, based on simultaneous data of speed, altitude, fuel consumption and tail pipe emissions. The methodology consists of three steps: (i) route selection; (ii) obtaining a representative sample of real cycles from vehicles driven in the region of interest; (iii) identification of the typical driving cycle as the one out of the real cycles sampled, whose characteristic parameters have the minimum weighted differences with respect to the average values of all cycles sampled. This method does not require the measurement of fuel consumption nor the emission of pollutants. However, by following this method, a vehicle that reproduces the resulting cycle exhibits a fuel consumption, and tailpipe emissions similar to the average of these variables shown by the entire population of vehicles with the same technology being driven in that region. We applied it to a fleet of 15 buses of the same technology covering the same routes over 8 months, in an area of high altitude with flat and hilly terrain. Measured fuel consumption and tailpipe emissions for the resulting driving cycle were within the 4% of difference with respect to the average values of all cycles sampled.

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