

## PhD THESIS ABSTRACT

### **”COMPARATIVE STUDY OF AUTOMOBILE’S ENGINE FUNCTIONING WITH GASOLINE AND LIQUEFIED PETROLEUM GAS”**

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The paper covers an important and of a high interest topic related to automotive field, regarding the use of alternative fuels instead of oil based fuels. In this context, the main purpose of the paper consists in establishing and applying a comparative study algorithm, both theoretical and practical, of engine functioning with gasoline and LPG, by using a systemic and interdisciplinary approach.

Chapter 1 contains a topic synthesis, a presentation of PhD thesis main goals, but also several aspects regarding the development of practical part. Experimental tests were conducted with a Skoda Octavia autovehicle, equipped with a gasoline injection engine and a LPG multipoint injection plant. During tests, the functional parameters were acquired and stored due to on-board computer and engine’s embedded sensors and actuators.

Chapter 2 presents the engine time comparative analysis of functional parameters which consists of a statistical study on influence sizes and a presentation of several functional characteristics. The purpose of this chapter was to highlight the variation of engine functional parameters, but also to outline conclusions about the functioning of an electronic controlled engine.

Chapter 3 is intended to a frequency comparative analysis of engine functioning. It contains a consecutive presentation of results obtained from applying single spectral analysis, coherence analysis, polyspectral analysis and time-frequency analysis. Frequency analysis provided information about signal’s internal structure, allowed establishing the spectre of frequencies for different parameters, determined high energy harmonic constituents and established correlation in frequency domain.

Chapter 4 approaches a comparative spectral analysis of engine functioning which highlighted each parameter contributions by applying matrix analysis and it also presents different sizes influences on engine performances by applying tensor comparative analysis.

Chapter 5 contains a comparative study of factors influence on engine functioning. The utility of the study consists in establishing connections between two dynamic processes, highlighting non linear character of parameters variation and making a comparative analysis of factors influence on resulting parameters.

Chapter 6 presents a comparative study of engine energy efficiency. First, it is presented a comparative analysis of engine dynamics by pointing out criteria of assessing energy efficiency and details about the experimental study. Follow-up there are presented criteria of assessing fuel saving efficiency. Also, there are highlighted criteria of evaluating engine energy efficiency, there are mentioned some comparative results obtained from the experimental study and it is analysed the possibility to optimize energy efficiency.

Chapter 7 presents general conclusions and main contributions to the comparative study, both theoretical and experimental, of engine functioning with gasoline and LPG. There are stated some openings offered by the paper. Also, it is presented the list of papers published during doctoral study.