THE CONNECTIONS BETWEEN THE ENGINE SPEED, THE AIR EXCESS FACTOR AND THE INJECTIONS DURATION FOR THE MODEL SUGGESTED BY THE AUTHORS

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ABSTRACT

In this paper the fuel metering scheme is presented for both the multipoint and singlepoint injection system designed by authors. The software outputs are the 3-dimensional variations between angular speed and ambient temperature respectively angular speed and λ coefficient.

1. INTRODUCTION

The system suggested by authors is presented in figure 1 which is a system that can be adapted to the engines of standard DACIA type passenger car or the Logan type car which both have the following characteristics of engine, table 1[4].

Table1.

Version / Characteristics	S (standard)	T (Logan)
Engine code	810 – 99	106 – 20
Bore- Stroke [mm]	73 – 77	77 – 83,6
Displacement [cm3]	1289	1557
Compression ratio	8,5 : 1	9,25 : 1
Fuel	Petrol unleaded	
Fuel metering	Electronic injection - Single point - Multi point	
Idle speed	750 – 800 rpm	
The valves` clearance - at cold engine	0,15 Inlet valves 0,20 +Exhaust valves	
Firing order	1 3 4 2	

The systems main task is the establishment of connection between the quantity of the engine's intake air and the quantity of the injected fuel working-cycle by working-cycle forming a mixture of maximum economically for the engines in each operation points of the engine map at each workings conditions. For the model of the system proposed by the authors was proposed one system from injection of gasoline Bosch Motronic which is operated by power for air with ultrasonor valve. It is used by plate from acquisition from trial, program from acquisition from date, electrical sensor for temperature, electrical for pressure, electrical sensor for engine speed and angular position of throttle valve, exhaust gas sensor. It was made one study for select air excess factor λ=1 (electronic dosage).

In figure 1 is presented the the fuel metering system of the Renix system, used to the conversion of the system suggested by the authors.

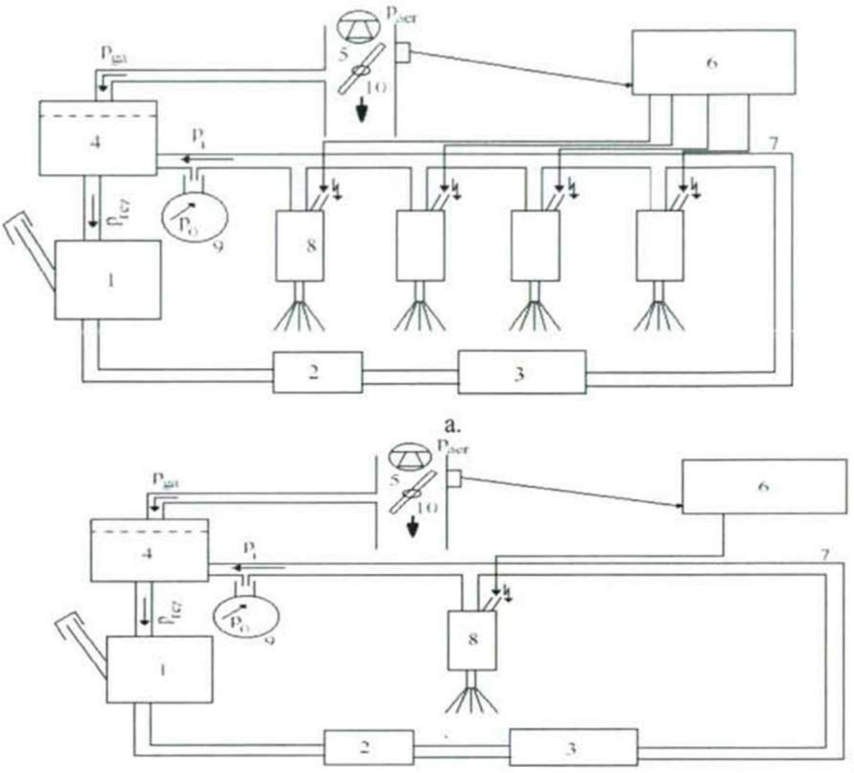

Fig. 1 The scheme of fuel metering system suggested by the authors: a – Renix system; b – Mono Motronic system: 1– petrol tank; 2. – electric pump; 3. – electric filter; 4 – pressure regulator; 5 – flow meter (traductor for the measure of the air`s quantity); 6 – control unit; 7 – injection main line; 8 – electromagnetic injection; 9 – little lid valve for the measure of the pressure in the system; 10 – acceleration flap.

The electronic injection system determine the connection between the injected gasoline quantity on cycles at engines each work conditions and the quantity of intake air, thus injectors opening time establishes in adherence to the evidence stall, with control units manually operated according to the effective engine moment and the minimum polluted emissions (carbon monoxide, hydrocarbon, nitrogen, oxide) afterwards this is motorized in the injection. Equipment's control unit , tabular or under variations curves form of the injectors opening time depending on engine speed, having as variable parameter either the pressure in the intake manifold or the throttle valve's position, has to be especially precise.

The adjustment of the injected petrol quantity for each working cycle for the different engines working conditions depend on the intake air quantity due to the air flow meter which is equipped with a sensor which transmits information in regard of the airs excess to the control unit.

The air flow meter with palette and a sensor element are with an airs flow meter of Karman VORTEX type that improves the engines performance. A study was made for the choosing of the airs excess factor. It is made by the pressure regulator; it is; the pressure regulator constant was determinated taking into consideration the electromagnetic injectors. It is made and it is calculated the injections duration.

The molding of engine with spark firig cycles with gasoline injection supposed by the authors is carried out by the 3-D dimensional and by dimensional parameters in two cases in figure 2 and 3.

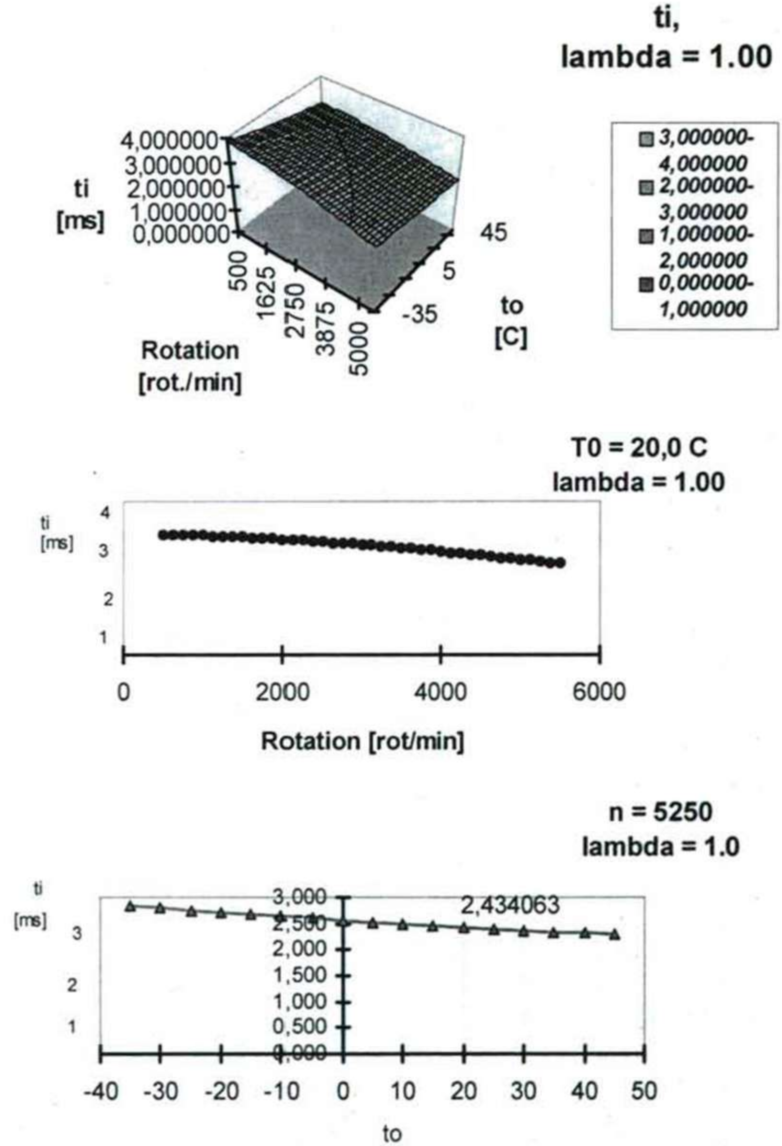

Fig.2 The connnections between the engine and the airs excess factor of the injections duration for the model suggested by the authors.

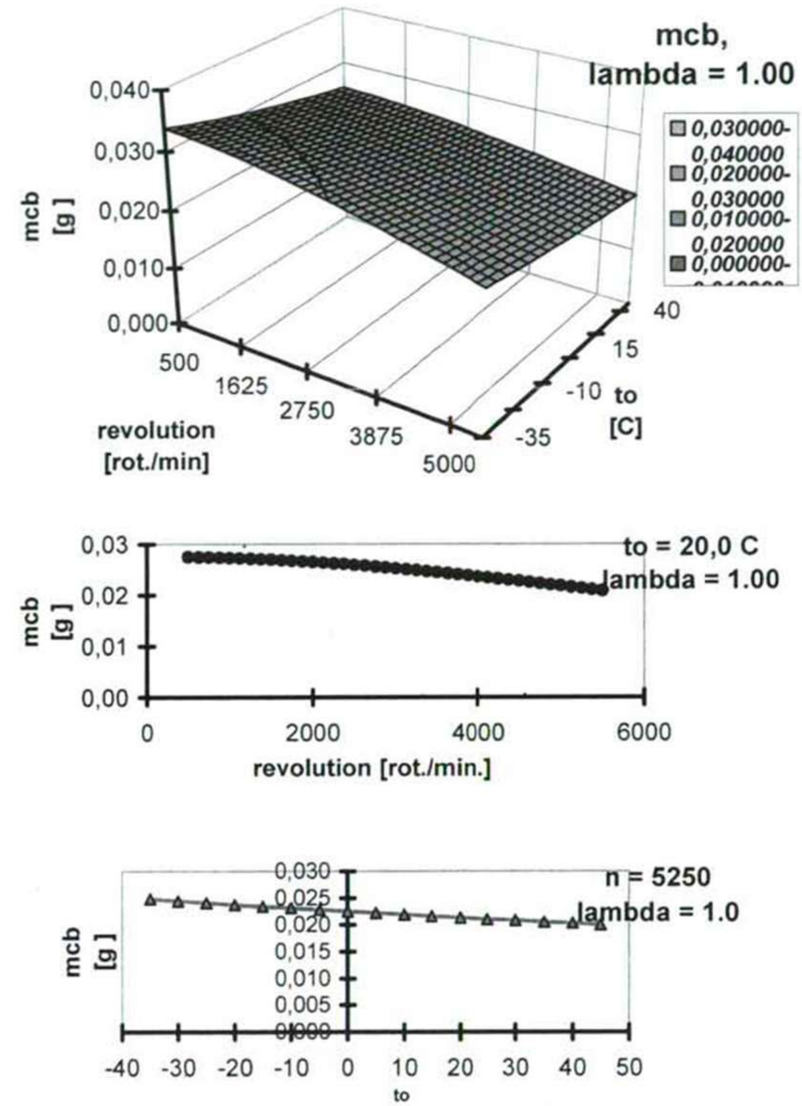

Fig.3 The connnections between the engines speed and the ambient temperature of the fuel mass for the authors suggested model.

2. THE THEORY FROM CALCULATION

A delicate problem from point of program on the computer, adiabatic coefficient is it starting calculation, temperature in different point are unknown and the adiabatic exponents not can be determinable. For solution of this problem has been used at impose to some value, found initial more correct, who permit a cycle crossing and determination more precise temperature.

The temperature at the finished admission T_a was to consider known as initial date and she's expression calculation it be used at the finished as equation from verify at finished the cycle

Through calculate again of adiabatic exponent on amount foundation temperature's to get from the new cycle. In this mode, through some cycle the error can be reduce upside a calculate estimate admit in a thermic calculus very pretentious. Must be introductory simplify hypothesis that one with starting burning at finished corresponding thermic agent composition it is instantaneous beckoning that finished corresponding the excess coefficient from air λ with who are place burning fuel.

It be to achieve a experimental equipment for try the proposed model by the author, gifted with device and electrical sensors necessary of modeling.

3. THE PROPOSED CONTRIBUTIONS

It was realized a program from calculate parameter spark ignition engines with electronic injection from gasoline with subrogates:

- the program from calculate to parameter spark ignition engines with electronic injection from gasoline (dependence after revolution n and excess coefficient of air λ at temperature ambient medium t_o=-35...+45°C and pressure ambient medium $p_o=1\cdot10^2$ kPa);

- the program from calculate to parameter spark ignition engines with electronic injection from gasoline (dependence after revolution n and temperature ambient medium t_o at excess coefficient of air $\lambda=1$ and pressure ambient medium $p_o=1\cdot10^2$ kPa);

-the program from calculation of cycle spark ignition engines with electronic injection from gasoline.

With helping from calculate it be calculating and represent variation 3-D adiabatic and politropic coefficient, temperature and pressure in the characteristic point of cycle, coefficient from fill, dosage, measure thermal combustion of unity cylinder engine, rapport from grow of pressure in izocore combustion, rapport growth volume in post burning, the technical-economical of driving and duration injection.

It be representation 3-D variation of parameter technical-economic of model proposed with revolution engine and temperature ambient medium. It be to achieve a comparation between the calculate and measured of duration injection and angle injection with revolution growth from at 500 at 6500 rpm, of engine with electronic injection gasoline type Bosch Motronic. It be realization one comparation between diagram theoretic from cycle proposed by the author and diagram of engine with electronic injection of gasoline, that was obtain one the experimental installation.

The determination of pollution produce itself in conformity with principle prescription, the engine to equip with electronic injection of gasoline that it can be put in pollution standardize from Europe in vigor.

It be to effect calculation error and the correction factor face atmospheric condition from reference, on the engine electronic injection of gasoline system. For engines fitting out with propose from author it well be raise on engine stall, from foundation diagram 3-D for duration injection, angle from kindling at total load and partial load and enrichment coefficients at total load.

Investigation realized is to be continued for determine mechanical loss at electronic injection of gasoline, in domain little revolution.

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