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FACULTY of MECHANICAL ENGINEERING, MECHATRONICS AND
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TECHNIQUE OF MOTOR VEHICLE INDICES CALCULATION WHILE TRANSITION OF ITS ENGINE FOR OPERATION AT THE MIXTURE OF DIESEL AND BIODIESEL FUELS

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Abstract: *The paper considers the technique of calculation of technical, economical and ecological indices of the engine and motor vehicle on the whole in the process of usage of engine supply system with dynamic regulation of percentage composition of diesel and biodiesel fuels in the mixture. Values of fuel mixture burning duration depending on its temperature, percentage composition and cyclic fuel supply are given.*

Keywords: *biodiesel, diesel, fuel mixture, dynamic regulation of percentage composition, system of fuel supply.*

1. Introduction

One of the key elements for any kind of economic activity is energy branch of national economy. Demand for energy in the countries of the world is constantly growing and such dynamics will remain in the future. Ukraine imports 43% of energy resources from total needs. In recent years the country produced on average four million tons of oil with gas condensate and 18 milliard m³ of natural gas, that equals 10 and 20% of the country needs, correspondingly. One of the largest consumers of liquid oil-based fuels is automobile transport, besides it also influences the ecological state of the environment.

In order to decrease the dependence of the state on the imported fuels research aimed at the usage of alternative fuel is carried out. Biodiesel fuel (BF) is one of the promising substitutes of conventional oil-based fuels. Ukraine possesses powerful potential in the sphere of biofuel, in particular, biodiesel fuel, starting from cultivating raw material –up to final product (biodiesel fuel). Raw material

for biodiesel fuel production may be various vegetable oils, rape oil and processed sunflower oil are also available.

As an alternative fuel, biodiesel fuel (BF), obtained from vegetable raw material, can completely replace diesel fuel (DF). Raw material for the production of BF can be cultivated in the country, that is why, usage of biodiesel fuel decreases the dependence of Ukraine on the imported fuel. Nowadays the problem of alternative fuel usage as the fuel for the engines of motor vehicles is the promising direction of research, it enables not only to reduce operation expenses but also decrease the amount of harmful emissions of exhaust gases.

Usage of biodiesel fuel for diesel engines has been studied for many years. In [1-8] the results of the study dealing with the impact on technical, economical and ecological indices of the diesel engine of the usage of pure biodiesel and its mixture with diesel are given. But greater part of studies was carried out using the mixture of diesel and biodiesel fuels with constant percentage composition. Manufactures of motor vehicles [1-2] also