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## **ANALYSIS OF METHODS FOR CHOOSING OPTIMUM GEAR RATIOS OF MECHANICAL SPEED GEARBOX**

The main task of car designs in the world is to improve safety, environmental and efficiency indicators, while maintaining the required level of tractive-speed and brake characteristics, smoothness of motion, stability, controllability and manoeuvrability, passability of a vehicle.

Depending on the class of a vehicle, its terms of exploitation and function there is a problem of providing optimal modes of its engine when necessary load and speed modes can be implemented. In solving this problem it is necessary to take into account the type of power equipment, transmission type and, in the case of mechanical stepped transmission, gear ratios and the law of their distribution, etc. When choosing gear ratios of mechanical speed gearbox lower and higher gear ratios are primarily determined. The choice is influenced by two conditions. Firstly, it is a car budget in the heavy road conditions and driving at a minimum speed and, secondly, vehicle movement with a maximum set speed.

Determination of gear ratios, ranging from the second gear to the penultimate (before the highest) transmission is currently carried out on the following methods:

- The law of geometric progression;
- The law of arithmetic progression;
- The law of harmonic series;
- Providing the maximum intensity of acceleration;
- Providing high rates of fuel economy and transporting productivity;
- Taking into account the range density;
- By approaching the ideal transmission characteristics, etc.

The existing methods of selecting gear ratios and their allocation to M1 category vehicles of leading world motor vehicle manufacturers have been analyzed in the study. Actual regularity of their choice is determined on the basis of gear ratios distribution analysis. Calculations of traction-speed performance and fuel-economic characteristics of M1 vehicles have been carried out.