

# Design of an electromechanical propulsion system for mobile robots and future vehicles

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**1. Introduction** – Transportation accounts for about a quarter of energy use [1], so efficiency improvements in energy conversions allow reductions in fuel consumption and pollutant emissions of internal combustion engines used for vehicle propulsion. Our previous works [2-5] were devoted to important issues like energy storage techniques, power converters, hybrid vehicle configurations and zero-emissions-vehicles (ZEVs) powered by batteries, supercapacitors or fuel cells. A substantial gain in vehicle efficiency is primarily a matter of improved vehicle design and only secondarily depends on engine type and efficiency. In fact measures like reductions of vehicle mass, aerodynamic drag and rolling resistance contribute to less power and mass needed for both engine and drivetrain. The authors are now focused on innovative propulsion systems [6-8] in order to achieve greater vehicle efficiency and higher safety in transportation means (i.e. the propelling force is independent of drag between traction wheels and road — useful especially in bad weather conditions).

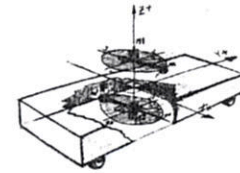


Image 1. New propulsion system for mobile robots and future transportation means.

**2. Experimental** – A small prototype for concept evaluation was designed [9], built and tested.

**3. Results and Discussion** – This work gives a design methodology, details of the proposed propulsion system, its limitations and advantages in comparison with conventional drivetrains used in mobile robots and other efficient and clean vehicles.

**4. Conclusions** - This paper deals with the design of a new propulsion system capable to meet the requirements of future transportation means. The main contributions are innovation in the integration of propulsion, braking and steering functions, and higher safety than conventional vehicles.

## 5. References

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