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Jonathan Graf* (jgraf1@students.towson.edu), 4300 E. Joppa Rd, Baltimore, MD 21236, and
Olga Stulov and **Jim Sochacki**. *What Moves You: Using Legs for Vehicular Transportation*.

Most vehicles are transported by the rotation of wheels. The Department of Mathematics and Statistics and Department of Engineering at James Madison University are interested in developing vehicles that will be driven by the motion of legs rather than wheels. In this talk we discuss the motion of five different legs: first, we derive the equations of motion for each leg; second, we calculate the equations for velocity, acceleration, energy and power; third, we optimize the motion by minimizing energies and forces. In order to obtain these results, we developed a differential equation, solved it using the Parker-Sochacki Method and reached the optimal solution using Maple's minimization package. (Received August 30, 2009)