# Mathematical Model of Terrain Truck

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**Abstract**

To research all-wheel-drive 6x6 terrain truck dynamics was used decomposition method [1]. In this way mathematical truck model was divided in three subsystems [2, 3]: 1. Engine-driveline-driving wheels [4]; 2. Chassis-suspension-driving wheels [5]; 3. Road surface. Mathematical model was created using special simulation software Siemens LMS Imagine.Lab and Matlab/Simulink. The result is a model, that allows us to evaluate the external vehicle dynamics and internal driveline dynamics. By simulation results it was concluded [6, 7, 8, 9]:

1. With using of locking inter-axle differential, drive axles of the vehicle overloaded by double and triple dynamic forces against static forces, calculated by maximum engine torque in consideration of static traction forces and static reactive toques on drive axles.

2. In the case of slipping wheels, with using of locking interwheel differential, dynamic redistribution of torques obeys the dynamic conditions of interaction of driving wheels and road surface and depends on dynamic redistribution of vertical forces in contact with road surface.
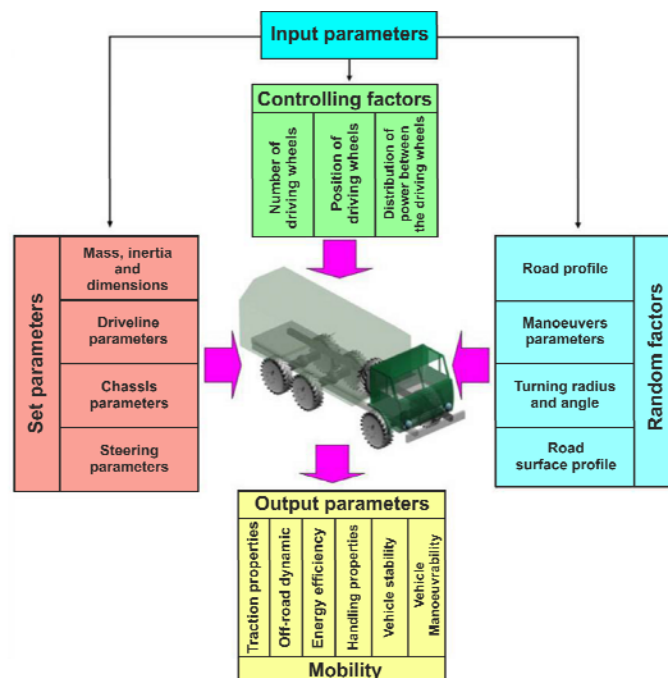
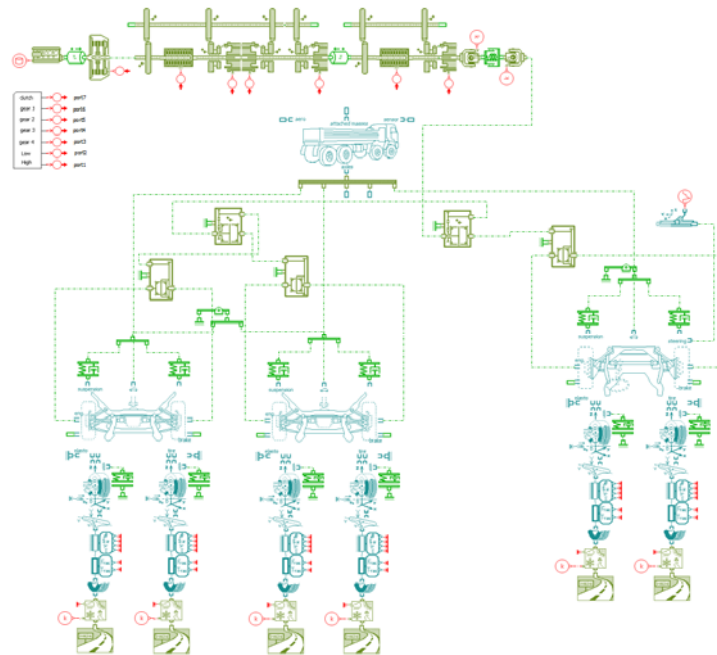Figure 1: Structure of mathematical truck model.

Figure 2: Functional scheme of mathematical truck model in Siemens LMS Imagine.Lab.

**Acknowledgment**

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