Introduction: With this research the Virtual Prototype of the dual electromagnet Active Magnetic Levitation System was realized. The mixed mode of Partial Differential and Ordinary Differential Equations is used to realize the levitated object motion.

Computational Methods: To obtain a complete dynamical model solved in time-domain the synergy of the following components was applied: electromagnetic force calculation using magnetic field physics interface, dynamic motion equation, controller formula, control and state constraints.

Conclusions: The prototyping supported by COMSOL Multiphysics allows to proof the concept and to obtain a fully functioning model. The dynamical model with the embedded controller provides a basis for further control research.

Results: The object levitation was realized in two scenarios: a) in the gravity field with external excitation force generated by the lower electromagnet (Fig. 3), b) without the gravity field in the differential control mode (Fig. 4).

References: