

Title: Simulation of a generalized Atwood's machine with Wolfram Mathematica

We consider a generalized version of Atwood's machine when two bodies of masses m_1, m_2 ($m_1 \leq m_2$) are attached to opposite ends of a massless inextensible thread wound round two massless frictionless pulleys of negligibly small radius. Both bodies are allowed to oscillate in the plane. Such a system has three degrees of freedom and is essentially non-linear. It demonstrates different kinds of motion, for example, quasi-periodic motion even in the case of equal masses of the bodies. Doing necessary symbolic calculations with Mathematica, we have shown that there exist periodic solutions of the equations of motion. Validity of the results obtained is demonstrated with the computer algebra system Wolfram Mathematica.