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# Rope Coiling on a Plane

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Feeding the elastic rope steadily from the height toward a plane with constant velocity results in the circular coiling which is a manifestation of the buckling instability. The axial compressive forces, responsible for the buckling instability, are the own weight of rope due to the gravity and the inertial force due to the momentum of rope. The coiling frequency and the coiling radius are studied as a function of height and feeding velocity. Remarkably, there exists a characteristic velocity $v^*$ at which the coiling radius is largest. At feeding velocity faster than the characteristic velocity $v^*$ the inertial force dominates over the gravitational force. This characteristic velocity $v^*$ is experimentally found to increase with decreasing height $h$ in qualitative agreement with the dimensional analysis argument which predicts the relationship $v^* \sim h^{-1}$.

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