

TABLE VII.1: ELEMENTS OF THE TRANSLATIONAL MECHANICS DOMAIN


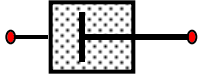
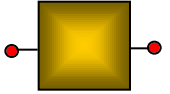
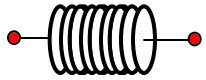
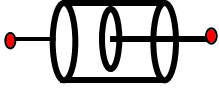
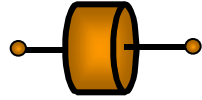
Element	Symbol	Parameter	Dynamic Variables	Geometric relations	Newton's law	Constitutive Relations	Energy stored or Power dissipated
Spring		Spring constant K (N/m)	Force: f_{sp} Stretch: r_{sp}	$r_{sp} = x_{right} - x_{left}$	$f_{right} = f_{left} = f_{sp}$	$f_{sp} = Kr_{sp}$	Potential energy: $= \frac{1}{2} Kr_{sp}^2$
Damper		Damping coefficient C (Ns/m)	Force: f_D Rate of stretch v_D	$v_D = \dot{x}_{right} - \dot{x}_{left}$	$f_{right} = f_{left} = f_D$	$f_D = Cv_D$	Power dissipated $P = Cv_D^2$
Mass		Mass m (kg)	Velocity: v_m	$v_m = \dot{x}_{right} = \dot{x}_{left}$	$f_{right} - f_{left} = m\dot{v}_m$	-	Kinetic energy: $K = \frac{1}{2} mv_m^2$

TABLE VII.2: ELEMENTS OF THE ROTATIONAL MECHANICS DOMAIN

Element	Symbol	Parameter	Dynamic Variables	Geometric relations	Newton's law	Constitutive Relations	Energy stored or Power dissipated
Torsional Spring		Torsional spring constant k (Nm/radian)	Torque: T_{sp} Angle of twist: θ_{sp}	$\theta_{sp} = \theta_{right} - \theta_{left}$	$T_{right} = T_{left} = T_{sp}$	$T_{sp} = k\theta_{sp}$	Potential energy: $= \frac{1}{2} k\theta_{sp}^2$
Rotary Damper		Damping coefficient c (Nm.s)	Torque: T_D Rate of twist: ω_D	$\omega_D = \dot{\theta}_{right} - \dot{\theta}_{left}$	$T_{right} = T_{left} = T_D$	$T_D = c\omega_D$	Power dissipated $P = c\omega_D^2$
Rotary Inertial element		Mass moment of inertia I (kg.m ²)	Angular velocity: ω_I	$\omega_I = \dot{\theta}_{right} = \dot{\theta}_{left}$	$T_{right} - T_{left} = I\dot{\omega}_I$	-	Kinetic energy: $K = \frac{1}{2} I\omega_I^2$