

22.2: Table of Dimensions

I supply here a table of dimensions and MKS units of some mechanical quantities. Some are obvious and trivial. Others might be less so, and readers to whom this topic is new are encouraged to derive some of them from the definitions of the quantities concerned. Let me know (jtatum at uvic.ca) if you detect any mistakes.

I do not know whether angle is a dimensionless or a dimensioned quantity. I can convince you that it is dimensionless by reminding you that it is defined as a ratio of two lengths. I can convince you that it is dimensioned by pointing out that it is necessary to state the units (e.g. radians or degrees) in which it is expressed. This might make for an interesting lunchtime conversation

Mass	M	kg	
Length	L	m	
Time	T	s	
Density	ML^{-3}	$kg\ m^{-3}$	
Speed	LT^{-1}	$m\ s^{-1}$	
Acceleration	LT^{-2}	$m\ s^{-2}$	
Force	MLT^{-2}	$kg\ m\ s^{-2}$	N
Work, Energy, Torque	ML^2T^{-2}	$kg\ m^2\ s^{-2}$	J, N m
Action	ML^2T^{-1}	$kg\ m^2\ s^{-1}$	J s
Rotational inertia	ML^2	$kg\ m^2$	
Angular speed	T^{-1}	s^{-1}	rad s^{-1}
Angular acceleration	T^{-2}	s^{-2}	rad s^{-2}
Angular momentum	ML^2T^{-1}	$kg\ m^2\ s^{-1}$	J s
Pressure, elastic modulus	$ML^{-1}T^{-2}$	$kg\ m^{-1}\ s^{-2}$	Pa
Gravitational constant	$M^{-1}L^3T^{-2}$	$kg^{-1}\ m^3\ s^{-2}$	$N\ m^2\ kg^{-2}$
Dynamic viscosity	$ML^{-1}T^{-1}$	$kg\ m^{-1}\ s^{-1}$	dekapoise
Kinematic viscosity	L^2T^{-1}	$m^2\ s^{-1}$	
Force constant	MT^{-2}	$kg\ s^{-2}$	$N\ m^{-1}$
Torsion constant	ML^2T^{-2}	$kg\ m^2\ s^{-2}$	$N\ m\ rad^{-1}$
Surface tension	MT^{-2}	$kg\ s^{-2}$	$N\ m^{-1}$
Schrödinger wavefunction Ψ	$L^{-3/2}T^{1/2}$	$m^{-3/2}\ s^{1/2}$	
Schrödinger wavefunction ψ	$L^{-3/2}$	$m^{-3/2}$	

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