CHAPTER 11
DIMENSIONS

Although we have not yet met all of the quantities in use in electricity and magnetism, we have met most of the important ones. Of those yet to come, some, such as impedance and reactance, will obviously have the dimensions of resistance; some, such as reluctance and permeance, you will rarely come across; and some, such as magnetic susceptibility, will obviously be dimensionless. Now is therefore quite a convenient time to gather together the various quantities we have come across, together with their dimensions (i.e. the powers of M, L, T and Q of which they are composed) and their SI units. It will be a good time, too, for the reader to review the definitions of the various quantities and to verify, from their definitions, their dimensions. Let me know (jtatum@uvic.ca) if you find any mistakes in the following table.

	Powers of				SI unit
	M	L	T	Q	
Force	1	1	−2	0	N
Work, energy	1	2	−2	0	J
Torque	1	2	−2	0	N m
Power	1	2	−3	0	W
Linear momentum, impulse	1	1	−1	0	kg m s^{-1} or N s
Rotational inertia	1	2	0	0	kg m^2
Angular momentum	1	2	−1	0	J s
Electric charge	0	0	0	1	C
Electric dipole moment	0	1	0	1	C m
Current	0	0	−1	1	A
Potential difference	1	2	−2	−1	V
Resistance	1	2	−1	−2	Ω
Resistivity	1	3	−1	−2	Ω m
Conductance	−1	−3	1	2	S
Conductivity	−1	−4	1	2	S m^{-1}
Capacitance	−1	−2	2	2	F
Electric field E	1	1	−2	−1	N C^{-1} or V m^{-1}
Electric field D	0	−2	0	1	C m^{-2}
Electric flux Φ_E	1	3	−2	1	V m
Electric flux Φ_D	0	0	0	1	C
Permittivity	−1	−3	2	2	F m^{-1}
Magnetic field B	1	0	−1	−1	T
Magnetic field H	0	−1	−1	1	A m^{-1}
Magnetic flux Φ_B	1	2	−1	−1	T m^2 or V s
Magnetic flux Φ_H	0	3	−1	1	A m
Permeability	1	1	0	−2	H m^{-1}
Magnetic vector potential	1	1	−1	−1	T m
Inductance	1	2	0	−2	H