Subject: Re: Physical constants in IDL with !CONST
Posted by vlk.astro on Wed, 26 Dec 2012 20:31:15 GMT
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Here are some more (excluding the ones already in your list, and excluding some -- like Bode's distances -- which are clearly only of specialized interest) that I have found to be useful from time to time (I have been collecting them in http://hea-www.harvard.edu/PINTofALE/pro/util/inicon.pro). Some of these are probably too esoteric still (e.g., not many people want to convert from Angstrom to keV), but who knows.

```
ESU        4.8030000e-10       electron charge [ESU]
KB         1.3806620e-16       Boltzmann's constant [erg/K]
A          7.5656559e-15       Radiation Pressure constant [erg/cm^3/deg^4]
WEIN         0.28978000        Wein Displacement Law constant [cm K]
ATM           1013250.0        1 Atmosphere [dynes/cm^2]
KEVANG         12.398521       keV*Ang (1e8*h*c/(e*1e10))
EVWAV      0.00012379700       1 eV in wave numbers [/cm]
DEGEV      8.6173468e-05       1 deg K in eV [eV] (K*degev/1e3->keV)
JOULEV     1.6021892e-19       1 eV in Joule = Coulomb*meter [J]
ERGEV      1.6021892e-12       1 eV in ergs [erg]
THOMPSON         6.65246e-25   Thompson cross-section for electron [cm^2]
COMPTON       0.024263026      Compton wavelength for electron, h/mc [Angstrom]
RADIAN          206264.81      1 radian [arcsec]
ARCSR       2.3504431e-11      1 arcsec^2 in steradians [sr]
PI      3.14159265358979323846  PI to 20 decimals
GAMMA          0.57721566      Euler's constant, gamma
RYD            13.577755       Rydberg Constant for H [eV]
RBOHR       5.2922910e-09      Bohr Radius [cm]
DAY            86636.6   mean solar day [sec]
YEAR           31643326.       Equinoctial Year [sec]
YR             31644553.       Sidereal Year [sec]
PC          3.0926963e+18      1 parsec [cm]
LY          9.4867984e+17      1 Light Year [cm]
AU          1.4959787e+13      Astronomical Unit [cm]
MSUN        1.9890000e+33      Mass of Sun [gm]
LSUN        3.8260000e+33      Luminosity of Sun [erg/s]
RSUN       6.96900e+10   Radius of Sun [cm]
TSUN           5770.00   Effective Temperature of Sun [K]
PSUN           25.3800   Rotational period of Sun [day]
MJUP        1.8986000e+30      Mass of Jupiter [gm]
RJUP       6.99110e+09   volumetric radius of Jupiter at 1 bar [cm]
MGEO        5.9720000e+27      Mass of Earth [gm]
MMOON       7.3429237e+25      Mass of Moon [gm]
RMOON          1737.90   Radius of Moon [km]
DMOON          384404.   mean distance of Moon from Earth [km]
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Cheers,

VLK

On Tuesday, December 18, 2012 5:34:53 PM UTC-5, Chris Torrence wrote:
> Hi all,
>
>
>
> I'm adding a new system variable to IDL, called !CONST. So far, it's an IDL structure containing the following physical constants, in MKS units. All of these values (except for !const.pi, .e, .phi, and .R_earth) are taken from the "2010 CODATA Recommended Values," from NIST.
>
>
>
> Name Description Value
>
> alpha Fine structure constant 7.2973525698 x 10-3
>
> c Speed of light in a vacuum 299792458 m/s
>
> e Euler's number 2.7182818284590452
>
> ev elementary charge e, 1 electron volt 1.602176565 x 10-19 C
>
> eps0 electric vacuum permittivity 8.854187817 x 10-12 F/m
>
> F Faraday constant NAe 96485.3365 C/mol
>
> G Gravitation constant 6.67384 x 10-11 m3/kg/s2
>
> gn Earth standard gravity 9.80665 m/s2
>
> h Planck constant 6.62606957 x 10-34 J s
>
> hbar h/(2pi) 1.054571726 x 10-34 J s
>
> k Boltzmann constant R/NA 1.3806488 x 10-23 J/K
>
> me electron mass 9.10938291 x 10-31 kg
>
> mn neutron mass 1.674927351 x 10-27 kg
>
> mp proton mass 1.672621777 x 10-27 kg
>
> mu0 magnetic vacuum permeability 12.566370614 x 10-7 N/A2
>
> Na Avogadro constant NA 6.02214129e23 mol-1
>
> phi golden ratio 1.6180339887498948

>
> pi Pi 3.1415926535897932
>
> R molar gas constant 8.3144621 J/mol/K
>
> R_earth Earth radius (spherical) 6370997.0 m
>
> re classical electron radius 2.8179403267 x 10-15 m
>
> rydberg Rydberg constant Rinf 10973731.568539 m-1
>
> sigma Stefan-Boltzmann constant 5.670373 x 10-8 W/m2/K4
>
> u unified atomic mass unit 1.660538921 x 10-27 kg
>
>
>
> Here's my question: What am I missing? Are there any physical constants that most people would find useful for their day-to-day work. The key is "most" people - nothing too esoteric, or limited to a single scientific discipline, etc.
>
>
>
> Thanks!
>
>
>
> -Chris
>
> ExelisVis
>
> p.s. please limit your comments to !CONST. Our new widget system team is currently hard at work in a secret underground bunker, and cannot be disturbed.
