Summary Files

Summary files have the filename 'summary.txt'. They are text (ASCII) files containing one line for each time step. Each line is divided into 23 columns, containing the following data:

Column Number	Datum	Description
1	i	Step number
2	t	Age (years)
3	M	Mass ($M_\odot$)
4	$\mathrm{Log}_{10}\, L$	Luminosity ($L_\odot$)
5	$\mathrm{Log}_{10}\, R$	Radius ($R_\odot$)
6	$\mathrm{Log}_{10}\, T_s$	Surface temperature (K)
7	$\mathrm{Log}_{10}\, T_c$	Central temperature (K)
8	$\mathrm{Log}_{10}\, \rho_c$	Central density (kg m^{-3})
9	$\mathrm{Log}_{10}\, P_c$	Central pressure (N m^{-2})
10	ψ_c	Central electron degeneracy parameter
11	X_c	Central hydrogen mass fraction
12	Y_c	Central helium mass fraction
13	$X_{C,c}$	Central carbon mass fraction
14	$X_{N,c}$	Central nitrogen mass fraction
15	$X_{O,c}$	Central oxygen mass fraction
16	τ_{dyn}	Dynamical timescale (years)
17	τ_{KH}	Kelvin-Helmholtz timescale (years)
18	τ_{nuc}	Nuclear timescale (years)
19	L_{PP}	Luminosity from PP chain ($L_\odot$)
20	L_{CNO}	Luminosity from CNO cycle ($L_\odot$)
21	$L_{3\alpha}$	Luminosity from triple-alpha reactions ($L_\odot$)
22	L_Z	Luminosity from metal burning ($L_\odot$)
23	L_ν	Luminosity of neutrino losses ($L_\odot$)
24	M_{He}	Mass of helium core ($M_\odot$)
25	M_C	Mass of carbon core ($M_\odot$)
26	M_O	Mass of oxygen core ($M_\odot$)
27	R_{He}	Radius of helium core ($R_\odot$)
28	R_C	Radius of carbon core ($R_\odot$)
29	R_O	Radius of oxygen core ($R_\odot$)

How close to degeneracy are we? (White Dwarfs and Neutron Stars are made of degenerage electrons and neutrons, respectively)

tdyn ~ (sound speed)/(length scale)

How long it would take star to radiate away all its gravitational energy if nothing opposed its collapse

How long until the star burns all of whatever it is currently burning?

Luminosity from He burning (if star is massive enough to eventually burn He)

Each nuclear process loses neutrinos - how much energy do they carry away per second?