

Configuration files

Below are configuration files of fort.23 and fort.22 :

Fort.23 :

```
      1      1      16      1      16      1  2650  2650      1
1.102E+00 3.000E-01      1
5.000E-02 5.000E-02      1
6.000E+00 3.000E-01      1
1.000E+00 1 0.00D+00
1.26400E+01 -1.00000E+00 0.00E+00 -1.00E+00 -1.00E+00 0.00E+00 0.55E+00 -1.00E+00 0
1.00E-01 2.00E+10 1.00E+07 0.00E+00 3.00E+00 5.30E+00 1.20E+00
6.30E+00 3.00E+02 1.00E+04 1.50E-01 1.00E-04 0.00E+00 1.00E+03
1.00E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
```

First line: 3rd/2nd last nos: no more than 20000 timesteps allowed at present.

last five lines:

```
      ROT      KS      EX      : KS=1 -> P1 = Pcrit1*10**ROT;
                                KS=2 -> P1 = Porb*10**ROT
                                KS=3 -> choose init. Porb so final PER, ECC => init. Porb, EX
alternative initial conditions if JMX >= 0, and if any item is non-negative:
```

```
      SM      DTY      AGE      PER      BMS      ECC      P1      ENC      JMX
conditions for termination:
      rlf1      age      LCarb      rlf2      LHe      rho      MCO
      rho      mdot      dtmin      XHe      eps      eps'      vmh8
      sm8      rest      of      line      not      yet      used
```

Notes - Bold parameters are marking for :

```
Time step of the evolution : 2650
Log SM : 1.102E+00
SM – stellar mass : 1.26400E+01 (Msun)
P1 – rotation speed : 0.55E+00 (d)
```

Fort.22:

```

199      2      1      1      12      0
      1      5      1      1      0      0      0
200      2      1      1      3 5000
      10     10 1.0E-09 1.0E-02 1.0E-07
2   3   4 39   8   9 10 11 12 46 47 48 49 52 59
57  9 39 10 11 12 13 14 15 16 17 18 19 20 21
45 37 36 38 39 40 41 43 43 43 43  1  1  1  1
0.90 1.05 0.30 1.0E-02 2.5E-01 1.0E+00 4.0E+00 1.0E+00
0.00 0.00 0.05 0.05 0.15 0.02 0.45 1.0E-04 1.0E+15 2.0E+04
0.176 0.052 0.502 0.092 0.034 0.072 0.072 0.0E+00 0.0E+00 0.0E+00
2.00E+00 1.00E-01 1.20E-01 1.20E-01 1.00E-02 1.50E-01 1.00E-03 1.00E+00 1.00E-02
3.04E-11 1.00E-02 1.00E-06 1.00E+02 0.00E+00 0.00E+00 0.00E+00 1.00E+00 0.00E+00
5.00E-01 1.00E+00 1.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
1000011111111110111100000000000000000000000000000000
1000011111111110111100000000000000000000000000000000 normal
      6      6      2      4      1      0      0      0      0      0
      7      8      4 12      5      3      9 10 11 16      1      2      6 13      0      0      0      0      0      0
      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
      1      2      3      4      5 16      6      7      8      9 10 11      0      0      0      0      0      0      0      0
      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
      1      2      3      4      5 16      6      7      8 10      6      7      8      9      0      0      0      0      0      0
      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0

```

Above set is for single-star evolution, including a model of dynamo-activity-driven mass loss and magnetic braking. It also includes hot, luminous wind following de Jager et al (1988), and a model of superwind with \dot{M} prop. to $L/(\text{env. binding energy})$.

Task job of the evolution process (this work)

run04

The following template identifies the numbers used in the above input file:

KH2 JCH KTH KX KY KZ - 1 line
KX = 0: pp chain not in =m; KX = 1: pp chain in =m
KY: max. no. of abundances used (better be 12)
KZ = 0: use simple TF approx; = 1: use integral approx.
KCL KION KAM KOP KCC KNUC KCN - 1 line
KT1 KT2 KT3 KT4 KT5 KO - 1 line
KR1 KR2 EPS DEL DH0 - 1 line
KSX(1 - 45) - 3 lines
CT1 CT2 CT3 CDC(1 - 5) - 1 line
CT(1) CT(10) - 1 line
CC CN CO CNE CMG CSI CFE C2H C3He CC13 - 1 line
CALP CU COV CPV CDR CXB CGR CGF CDF
CRM CTF CET CEA CMS CMT CMI CMJ CMK
CMR CML CHL CLT CPA CBR CSU CSD plus 10
more values not yet used
KYT(1 - 40) - 1 line: which burning rates used - 1 line
KEN(1 - 40) - 1 line: which energy gen. rates used - 1 line
KE2 KE1 KEV KBC KL JH1 JH2 JH3 JH4 JH5 - 1 line
ID(11 - 250) - 12 lines

KT1=100 - print internal details at every 100th timestep only
KT2=2 - print these details at every 2nd meshpoint only
KT3=1,2,3 - print 1, 2 or 3 'pages' of these details
KT4=4 - print a short summary of every 4th model only
KT5=5 - print convergence details after 5 iterations at each timestep
KO - save the structural details every KO timesteps.
Each 'page' has a selection of 15 columns, chosen from 45 variables computed
in PRINTB.F. These are:

	1	psi	2	P	3	rho	4	T	5	kappa	6	grada	7	grad	
8	gr-ga	9	m	10	H1	11	He4	12	C12	13	N14	14	O16	15	Ne20
16	Mg24	17	Si28	18	Fe56	19	H2	20	He3	21	C13	22	O18	23	Ne22

24	Mg25	25	Ba138	26	n	27	U	28	S	29	L/Edd	30	SH	31	k**2
32	wt	33	Ne	34	mdot	35	w	36	Prot	37	phi	38	xi	39	DGOS
40	DLDK	41	Dent	42	xik	43	V**2	44	F2	45	F1	46	r	47	L
48	Eth	49	Enuc	50	Eneu	51	1/mu	52	1/mu0	53	alp	54	bet	55	QM
56	fTF	57	w.l	58	AVM	59	dm	60	rotn	61	n/n+1	62	lr/lp	63	lm/lp

61, 62 and 63 are homology invariants, $\text{dlog } \rho / \text{dlog } P$, $\text{dlog } r / \text{dlog } P$ and $\text{dlog } m / \text{dlog } P$; L/Edd is the ratio of local luminosity to local Eddington luminosity; w is convective velocity, l is mixing-length. The 3 lines of KSX above give the selections to be printed.
