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19.11.62.
Stellar Models conv
uden tabel
forskellig skridtlængde
begin
real pi, G, H, kt, a, c, Ls, Rs, Ms, L, M, R, X, Y, Z, eps, kappa, rat, mod, recmo,
     U1, U2, U3, U4, I1, I2, I3, I4, d, mu, rhoc, Tc, Xv, muv,eps1, eps2, delt,
     xs, fg, step, skel, h,testg,testn,xe,xg,xn,teste;
integer s,ind,ud;
boolean conv;
array k, z,  y, buf[1:5];

real procedure pol(a, n, x); value n;
real x; integer n; array a;
begin real z; integer i;
z:= 0;
for i:= n step -1 until 0 do
z:= a[i] + z×x;
pol:= z;
end;
procedure INTGR(y,k,n,h,f);
value n,h;
real h; integer n; array k,y; procedure f;
begin
integer j;
procedure RK(y, k, n, h, f); value n, h; real h ; integer n;
 array k, y; procedure f;
begin integer j, i; array A[1:4], q,r[1:n];
A[1]:= 0.5; A[2]:= 0.292893219;
A[3]:= 1.707106781; A[4]:= 0.166666667;
for j:= 1 step 1 until n do q[j]:= 0;
for i:= 1,2,3,4 do begin f(y,k, h);
for j:= 1 step 1 until n do begin
r[j]:= A[i]×(k[j]- q[j]);
if i = 4 then r[j]:= r[j] - A[i]×q[j];
y[j] := y[j] +r[j];
if i < 4 then q[j]:= q[j] + 2×r[j] - A[i]×q[j] end end;
f(y,k,h)
end RK;

RK(y,k,n,h,f);
if y[1]<0 then go to set;
if y[2]<0 then go to set;
if sign(testn)=sign(testg) then begin
set: testg:= testn; for j:= 1 step 1 until 5 do buf[j]:= y[j] end
else begin xe:= y[5]; teste:= testn; xg:= buf[5];
iter: if abs(testn)>5_10-5 then
begin xn:= (teste×xg-testg×xe)/(teste-testg);
for j:= 1 step 1 until 5 do y[j]:= buf[j];
RK(y,k,n,xn-buf[5],f);
if sign(testn)=sign(teste) then begin xe:= xn; teste:= testn end
else begin xg:= xn; testg:= testn end;
go to iter end
else begin SKRIV(y); RK(y,k,n,buf[5]+h-xn,f); go to set end
end end;
procedure SKRIV(A);
array A;
begin
skrv(⦃n.dddd⦄, A[5]); skrv(⦃-ndd.dddd⦄, A[1], A[2], mod×A[3], mod×A[4],
rat, if conv then skrvml(9) else kappa, eps); skrvvr
end;

procedure DIFF(y, k, h);
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value h; real h; array y, k;
begin
real T, V, S, rho, x2;
procedure EPS;begin
if T < 8₁₀6 then eps1:= eps2:= 0 else
begin real f11, alpha, psi, u;
array epspp, epscn, aleph[0:4];
epspp[1]:= 2.5771; epspp[2]:= -0.3283 ;epspp[3]:=  0.0295; epspp[4]:= 0.0037;
epspp[0]:= -0.7670;
epscn[0]:= 3.6058;epscn[1]:= 13.0147; epscn[2]:=  -1.5036; epscn[3]:= 0.1032;
epscn[4]:= 0.0092;
aleph[0]:= 2.7078;aleph[1]:= 8.7862;aleph[2]:= -0.9864; aleph[3]:= 0.0627;
aleph[4]:= -0.0037;
u:= (y[3] - 16.555830)/0.660878;
f11:= 1 + 0.25₁₀9/sqrt(V);
alpha:= (Y/4/X)↑2×exp(pol(aleph, 4, u));
psi:= 1 + 0.958×alpha×(sqrt(1 + 2/alpha) - 1);
eps1:= f11×X↑2×rho×psi×exp(pol(epspp, 4, u));
eps2:= (7×f11 - 6)×X×rho×0.96×0.6×Z×exp(pol(epscn,4,u));
end;
eps:= eps1 + eps2
end;

procedure KAPPA;
begin
real a0, a1;
a1:= if y[3] < 14.3 then 0.935 else
     if y[3] > 16.1 then 0.580 else
      3.686 - 0.1927×y[3];
a0:= 58.715918 - 3.75×y[3];
kappa:= 0.19×(1.0 + X) + exp(a0 + a1×y[4])
end;

T:= exp(y[3]); rho:= exp(y[4]); V:= exp(3×y[3] - y[4]); EPS; KAPPA;
x2:= y[5]↑2;
if y[5]<0.005 then begin k[1]:= k[2]:= k[3]:= k[4]:= 0;
 rat:= I4×mu×V/(I3×I2×eps×kappa)-1;
testn:= rat-1.5; conv:= if rat<1.5 then true else false end
else begin
S:= h×I4×y[1]×mu/(x2×T);
k[1]:= h×I1×x2×rho;
k[2]:= eps×I2×k[1];
k[3]:= h×I3×y[2]×kappa/(x2×T×V);
k[4]:= S - k[3];rat:= if k[3]≠0 then k[4]/k[3] else 1.5;conv:= false;
testn:= rat-1.5;if rat≤1.5 then begin
k[3]:= 0.4×S;
k[4]:= 1.5×k[3]; conv:= true; rat:= 1.5 end end;
k[5]:= h
end;

skrvvr;skrvtekst(⨽<STELLAR MODEL⨾);
pi:= 3.14159265; mod:= 0.434294482; recmo:= 2.30258509;
G:= 6.668₁₀-8; H:= 1.6734₁₀-24; kt:= 1.38024₁₀-16;
a:= 7.568₁₀-15; c:= 2.9979₁₀10;
Ls:= 3.86₁₀33; Rs:= 6.960₁₀10; Ms:= 1.991₁₀33;
U1:= 4×pi×Rs↑3/Ms; U2:= Ms/Ls; U3:= -3×Ls/(16×pi×a×c×Rs);
U4:= -G×Ms×H/(Rs×kt); ind:= læst; ud:= læst; h:= læst; fg:= læst;
M:=læst; X:= 0.70;Y:= 0.27; Z:= 1 - X -Y; d:= X + Y +2;
R:=læst; L:=læst; Tc:= læst; rhoc:= læst; mu:= 4/(5×X + d);
skrvvr; skrv(⨽-n.dd⨾, skrvtekst(⨽<log M =⨾), M, skrvtekst(⨽<    X =⨾),
 X,skrvtekst(⨽<    Y =⨾), Y, skrvtekst(⨽<    Z =⨾), Z);skrvvr;
skrv(⨽-n.dddddd⨾,skrvtekst(⨽<log R = ⨾), R, skrvtekst(⨽<    log L =⨾), L);
skrvvr; skrv(⨽nd.dddddd⨾, skrvtekst(⨽<log Tc =⨾), Tc,
skrvtekst(⨽<  log rhoc =⨾), rhoc);
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skrvtekst(╪<

     x         q         f    log T  log rho      rat    kappa      eps
╪);
R:= exp(recmo×R); L:= exp(recmo×L); M:= exp(recmo×M);
I1:= U1×R↑3/M; I2:= U2×M/L; I3:= U3×L/R; I4:= U4×M/R;
skel:= læst;
if ind=0 then go to CC;
buf[1]:= buf[2]:= y[1]:= y[2]:= 1;
buf[5]:= y[5]:= 0.95;
buf[3]:= y[3]:= ln(-0.2228×I4×mu×(1/y[5] - 1));
buf[4]:= y[4]:= ln(7.046₁₀-27×I4/I3×mu)/1.935 + 3.48837×y[3];
conv:=false; DIFF(y,k,1); testg:= testn; step:= -h;
ny1: INTGR(y,k,5,step,DIFF);
if y[1] < 0 then go to SK;
if y[2] < 0 then go to SK;
step:= if y[2]>fg then -h else -h/4;
xs:= y[5]+step;
if xs>skel then go to ny1
else INTGR(y,k,5,skel-y[5],DIFF);
SK: skrvvr; SKRIV(y);
CC: if ud=0 then go to last;
buf[1]:= buf[2]:= buf[5]:=  z[1]:= z[2]:= z[5]:= 0;
buf[3]:=  z[3]:= recmo×Tc; buf[4]:= z[4]:= recmo×rhoc;
 DIFF(z,k,1); testg:= testn; step:= h/4;
ny2:  INTGR(z, k, 5, step, DIFF);
step:= if z[2]<fg then h/4 else h;
xs:= z[5]+step;
if xs<skel then go to ny2
else INTGR(z,k,5,skel-z[5],DIFF);
skrvvr; SKRIV(z);
last: end;
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