```
> # Get Density & Pressure Profile from xi and theta for lane-emden
  equation
  # xi and theta are generated using numerical integration (see file
  lane-emden-polytropic.mws)
  restart;
> # Set the inital density rho_c (gm/cm^3) and polytrope index n
  ndata := 689:
  rho_c := 1e8;
  n := 3;
  K := 1;
  G := 6.6726e-8;
```

$$rho\_c := .1\ 10^{9}$$

$$n := 3$$

$$K := 1$$

$$G := .66726\ 10^{-7}$$

```
> fd :=
  fopen("/home/reubendb/my_document/projects/genasis-docs/scratch/le
  -result.txt", READ);
  data := readdata(fd,float,2):
  fclose(fd);
```

$$fd := 0$$

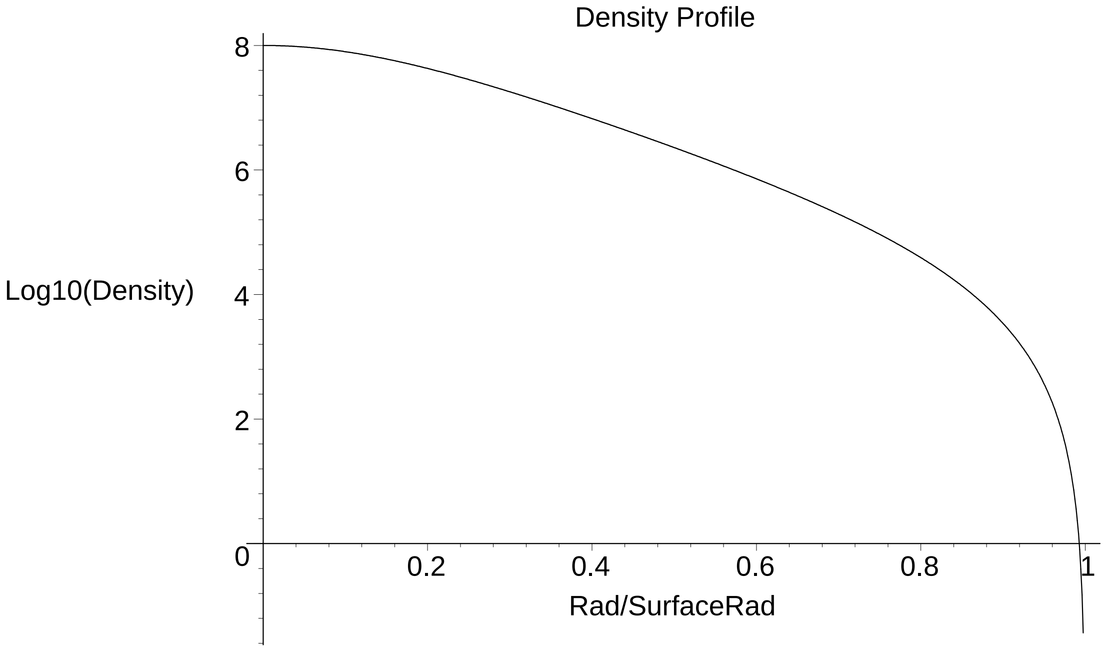
```
> for i from 1 to ndata do
    xi      := data[i,1];
    theta   := data[i,2];
    a       := evalf(sqrt((n+1)*K*rho_c^(1/(n-1)) / (4*Pi*G)));
    rho[i]  := rho_c*theta^n;
    r[i]    := a*xi;
    P[i]    := K*rho[i]^(1+1/n);
    dataout[i] := [r[i],rho[i],log10(rho[i]),P[i],log10(P[i])];
  od:
> # Write the surface Radius of the star:
  xi_1  := 6.89685:
  S_rad := a*xi_1;
  i := ndata+1:
  dataout[i] := [S_rad,1e-10,log10(1e-10),1e-10,log10(1e-10)];
```

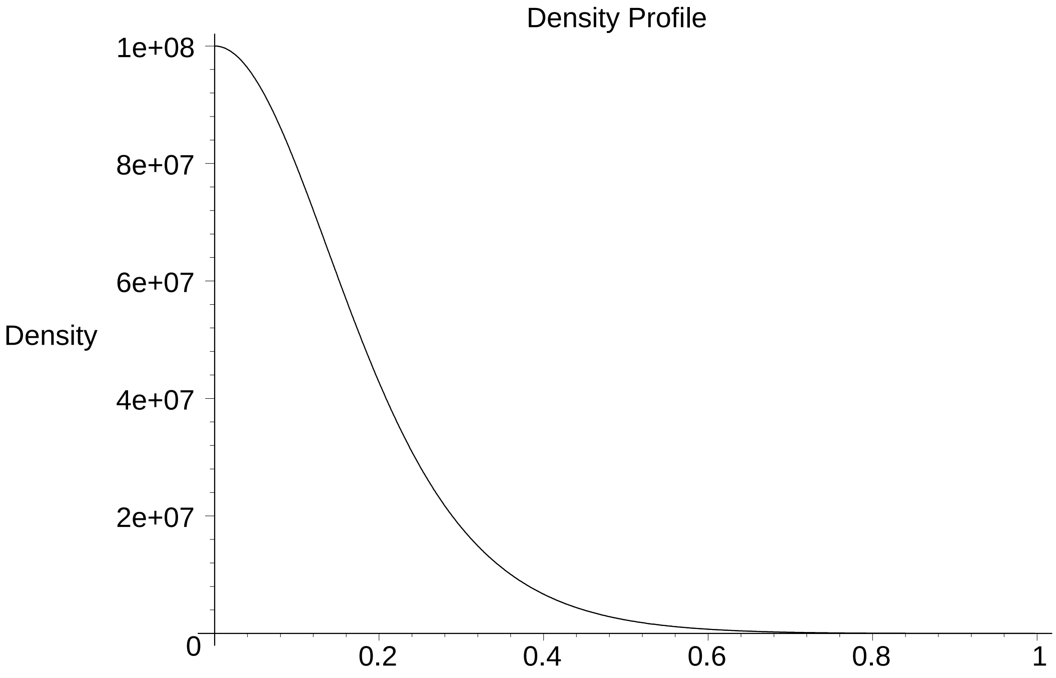
$$S\_rad := .1506358348\ 10^{7}$$

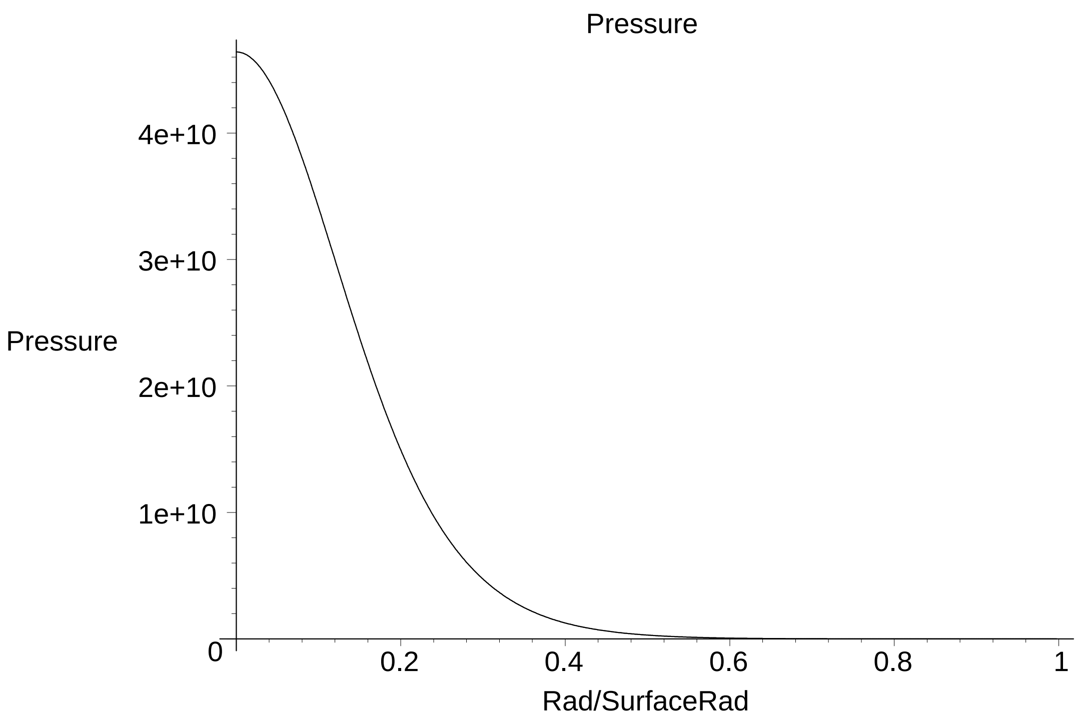
$$dataout_{690} := [.1506358348\ 10^{7}, .1\ 10^{-9}, -10.00000000, .1\ 10^{-9}, -10.00000000]$$

```
> # Plot the Density Profile and Pressure (log plot)
  PLOT(CURVES([seq([(r[i]/S_rad),log10(rho[i])],i=1..689)]),TITLE("D
  ensity Profile"),
       AXESLABELS("Rad/SurfaceRad","Log10(Density)"));
  PLOT(CURVES([seq([(r[i]/S_rad),rho[i]],i=1..689)]),TITLE("Density
  Profile"),
       AXESLABELS("Rad/SurfaceRad","Density"));
  PLOT(CURVES([seq([(r[i]/S_rad),P[i]],i=1..689)]),TITLE("Pressure")
  ,
```

```
AXESLABELS("Rad/SurfaceRad","Pressure"));
```








```
> fd :=
  fopen("/home/reubendb/my_document/projects/genasis-docs/scratch/pr
  ofile.txt", WRITE);
  writedata(fd,[seq(dataout[i],i=1..ndata+1)],float):
  fclose(fd);
```

$$fd := 0$$

```
>
>
```