

Running SeBa

This document explains how to run SeBa for stand-alone use (independent from AMUSE).

a) Simulation of one system:

with the parameters primary mass $M=2$ solar mass, secondary mass $m=1$ solar mass, eccentricity e , orbital separation $a=200$ solar radii, time $T=13500$ Myrs, metallicity $z=0.001$.

```
./SeBa -M 2 -m 1 -e 0.2 -a 200 -T 13500 -z 0.001
```

default values $e=0$, $T=13500$, $z=0.02$ (solar)

b) Simulation of multiple system - random population

Monte Carlo based approach

```
./SeBa -R -n 200
```

```
./SeBa -R -n 250000 -m 0.95 -M 10 -q 0 -Q 1 -A 1e6 -f 4 -T 13500
```

-R SeBa generates randomly the initial parameters

-n number of systems simulated

-m -M min/max primary mass

-q -Q min/max mass ratio

-e -E min/max eccentricity

-a -A min/max orbital separation

-T time in Myr in the simulation of the binaries. Same time for all binaries

-z metallicity of binary stars. Same metallicity for all binaries.

initial parameters are drawn from probably distributions

```
//// -x mass function exponent in case of power law [-2.35]
```

```
//// -F/f mass function option: 0) Equal mass
```

```
//// 1) Power-law [default]
```

```
//// 2) Miller & Scalo
```

```
//// 3) Scalo
```

```
//// 4) Kroupa
```

```
//// Option -F requires one of the following strings:
```

```
//// (mf_Power_Law, Miller_Scalo, Scalo, Kroupa)
```

```
//// -f requires the appropriate interger (see mkmass.C)
```

```
//// -y exponent for a power-law distribution [0] (flat in log)
```

```
//// -G/g Semi major axis option: 0) Equal_sma
```

```
//// 1) Power Law [default]
```

```
//// 2) Duquennoy & Mayor (1987)
```

```
//// Option -G requires one of the following strings:
```

```
//// (Equal_sma, sma_Power_Law, Duquennoy_Mayor)
```

```
//// -g requires appropriate interger (see double_star.h)
```

```
//// -v exponent for a power-law distribution
//// -U/u eccentricity option: 0) Equal eccentricity
////           1) Power Law
////           2) Thermal distribution [default]
//// Option -U requires one of the following strings:
////           (Equal_ecc, ecc_Power_Law, Thermal_Distribution)
////           -u requires appropriate interger (see double_star.h)

//// -w exponent for a power-law distribution
//// -P/p mass ratio option: 0) constant mass ratio
////           1) Flat_q
////           2) Power Law
////           3) Hogeveen (1992)
//// Option -P requires one of the following strings:
////           (Equal_q, Flat_q, qf_Power_Law, Hogeveen)
////           -p requires appropriate interger (see double_star.h)
////
```