Project n.3
Final report due November 29

- Generate a vector of N random numbers distributed according to a power-law probability density function between x=xmin and x=infinity, with index α. (use quantile function). (e.g. a Salpeter mass function for m>1 M_sun). Compare the estimates of α obtained with the following methods
  - Linear least square (histogram)
  - Linear least square (histogram; weighted by the counts of each bin; try different binnings see Maiz-Apellaniz & Ubeda 2005)
  - Linear least square of the empirical cumulative distribution function.
  - MLE estimator.
  - Moments
  - Non-linear least square.
- Find the distribution of α from n (e.g. n=100) different random realizations
- Explore the dependence of the results on N

  or

- Explore the dependence of the results on α
- Python and R

Project n.3
Final report due November 29

- Repeat homework n.2 (powerlaw.dat) using
  - Linear least square (histogram; e.g. weighted by the counts of each bin; try different binnings: e.g. equal-count binning see Maiz-Apellaniz & Ubeda 2005)
  - Linear least square of the empirical cumulative distribution function.
  - MLE estimator.
  - Moments
- Find one example of a power-law distribution in the astronomy literature: how was the distribution calculated? How was the index of the power-law calculated?

Project n.3
Progress report due November 15

- Find one example of a power-law distribution in the astronomy literature: how was the distribution calculated? How was the index of the power-law calculated? Summarize what you found in one figure.

- Project progress report

Power-law

- p.d.f. $f(x)=\alpha\, b^{\alpha}/x^{(\alpha+1)}$ For x>=b
- c.d.f. $F(x)=1-b^{\alpha}/x^{\alpha}$
- Quantile function $q(r)=b/(1-r)^{(1/\alpha)}$ r=[0,1)