

# PERIOD SEARCH BENCHMARK

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WEDNESDAY 6TH OF JULY 2005

# MANY PERIOD SEARCH METHODS

- Fourier transform:
  - [Deeming, 1975, Ap&SS 36, 137](#) (1976, Ap&SS 42, 257), in [Super Mongo](#) , in [FORTRAN](#)
  - [Lomb, 1976, Ap&SS 39, 447](#) , (see algorithm of Press) in [FORTRAN](#) described on [NR website](#) Section 13.8
  - [Scargle, 1989, ApJ 343, 874](#) , (see algorithm of Press) in [FORTRAN](#) described on [NR website](#) Section 13.8
  - [Horne & Baliunas, 1986, ApJ 302, 757](#), in [IDL](#)
  - [Ferraz-Mello, 1981, AJ 86, 619](#)
  - [Roberts et al., 1987, AJ 93, 968](#) "CLEAN" Algorithm, [Code in FORTRAN](#) from Doug Welch (McMaster University, Canada) or contact the authors (roberts at brandeis.edu, jlehar at alum.mit.edu) to get an original version
  - Press et al. (faster.f) in [FORTRAN](#) described on [NR website](#) Section 13.8
  - [Kurtz \(faster\) 1985, MNRAS 213, 773](#)
  - Mignard (FAMOUS algorithm), 2005, package available [here \(FORTRAN90\)](#). For latest version see [ftp.obs-nice.fr/pub/mignard/Famous](#)
  - [Cumming, Marcy & Butler, 1999, ApJ, 526, 890](#) for floating mean periodogram
  - Kunis & Potts [NFFT in C](#)
- String method
  - [Lafler & Kinman, 1965, ApJS 11, 216](#)
  - [Renson 1978, A&A 63, 125](#)
- PDM-ANOVA
  - [Jurkevich 1971, Ap&SS 13, 154](#)
  - [Stellingwerf, 1978, ApJ 224, 953](#), in [IDL](#)
  - [Schwarzenberg-Czerny 1989, MNRAS 241, 153](#)
- Wavelets:
  - [Foster 1996, AJ 112, 1709](#), adapted by [F.Kienzle in Fortran](#),
  - [Otazu et al., 2002, MNRAS 333, 365](#)

**Need to compare the methods**

# EMAIL AND ANSWERS

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1. General email: 18 April 2005

- Written by Eyer-Mignard-Pourbaix-Evans
- Answered by: **M.Beck**, V.Belokurov, A. Schwarzenberg-Czerny, J. Fabregat, P.Ortiz, M.Groenwegen, E.Poretti

**Success!**

But then: Barcelona, Princeton, Lund, Strasbourg, Rome, Geneva...  
so the work has been delayed, missed proposed deadline

I apologise

# DECISION ON SIMULATION

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1. Need of sampling law (F.Mignard, modified by D.Evans given to M.Beck)
2. 5,000 stars for each group with precise description
  - Gaussian noise
  - mono periodic
  - eclipsing binaries
  - multi-periodic
  - Real data: Hipparcos

# WE CAN DEFINE ALL NOW! TO HELP MATHIAS!

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- **Data Format:**
  - Initial:
    - number of measurements, time, measurement, error per line
  - Dimitri: "I would rather put all these pieces of information on a single line"
- **Mono-periodic** (log-scale), boundaries:
  - period
  - amplitude
- Eclipsing binaries (Devor, follow LMC)
- Multi-periodic:  $f_1, f_2, S_1/N, S_1/S_2$
- Hipparcos (what has been done: 2500 Per, 2500 Unsolved, 5000 non variable), random selection (files prepared but not rewritten)

# OUTPUT (FORMAT)

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- Period(s)
- Level of significance