

## Re: Mathematica Vs. Matlab

**Source:** <http://sci.tech-archive.net/Archive/sci.math.symbolic/2004-08/0170.html>

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In article <cfvmpd\$u\$1@fred.mathworks.com>, "Steven Lord" <slord@mathworks.com> wrote:

- > *Now rather than having an emotional and subjective discussion about the two*
- > *products (see my previous comment about a religious war) let's take a look*
- > *at a benchmark that I believe is fairly well-known and impartial:*
- >
- > <http://www.scientificweb.com/ncrunch/>
- >
- > *This is Stefan Steinhaus's report comparing Mathematica, MATLAB, and a*
- > *number of other software packages. Now since there have been changes to*
- > *both Mathematica and MATLAB in the two years since the report was last*
- > *compiled, it's probably about time for it to be rerun -- but as of the last*
- > *time it ran MATLAB scored higher than Mathematica in every category except*
- > *platform support, where they were tied with 100% each.*
- > *Look at the summary in section 8.2.*

Actually, Mathematica topped the mathematical functions, just ahead of Gauss, with Matlab in third place (see section 2.8). It appears that Mathematica's result in this table were incorrectly transcribed to the summary table in section 8.2. However, the computation of the weighted overall result is correct.

- > *I'd be surprised if the figures in that table changed so*
- > *wildly as to cause Mathematica to jump significantly higher than MATLAB, as*
- > *your comments seem to indicate would be your expectation.*

I would be most interested to see a revised comparison. Certainly, the numerical speed of Mathematica improved dramatically with the release of version 5. Since this was the worst area of Mathematica's performance in the Steinhaus survey, a significant change here would make a large difference to the overall outcome.

I have not read all of the Steinhaus survey but here are a few code one-liners and pointers to freely available Notebooks and Packages that provide some of the missing mathematical functionality:

Hadamard Matrices: Notebook available at  
<http://library.wolfram.com/infocenter/MathSource/499/>

HouseHolderMatrix:

```
HouseHolderMatrix[v_?VectorQ] :=  
  IdentityMatrix[Length[v]-2 Transpose[{v}].{v}]/(v.v)
```

PascalMatrix:

```
PascalMatrix[n_] :=  
  Table[Binomial[i+j,i], {i, 0, n - 1}, {j, 0, n - 1}]  
  
PascalMatrix[n_, 1] :=  
  (-1)^(Range[n]-1) CholeskyDecomposition[PascalMatrix[n]]  
  
PascalMatrix[n_, 2] := Reverse /@ PascalMatrix[n, 1]
```

ToeplitzMatrix:

```
ToeplitzMatrix[c_?VectorQ, r_?VectorQ] :=  
  Reverse[Partition[Join[Reverse[c], Rest[r]], Length[c], 1]] /;  
  0 < Length[c] == Length[r]  
  
ToeplitzMatrix[r_?VectorQ] := Transpose[ToeplitzMatrix[r, r]]
```

Dulmage–Mendelsohn decomposition: See

A Debugging Scheme for Declarative Equation Based Modeling Languages  
Peter Bunus and Peter Fritzson  
URL: <http://www.ida.liu.se/~petbu/publications/peterBPADL2002.pdf>

and

Bunus P. and Fritzson P.  
Linköping University, Sweden  
Methods for Structural Analysis and Debugging of Modelica Models  
URL: <http://www.modelica.org/Conference2002/papers.shtml>

Smith Normal Forms: Notebook available at  
<http://library.wolfram.com/infocenter/MathSource/682/>

Quadratic optimization is built-in in version 5.0.

Contingency-table data: See RiskQ 4.2 <<http://www.exetersoftware.com/cat/loehle/riskq.html>>

Gumbel distribution function: Notebook available at  
<http://mathworld.wolfram.com/GumbelDistribution.html>

Logarithmic distribution: Notebook available at  
<http://mathworld.wolfram.com/LogarithmicDistribution.html>

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S distribution: Package available at  
<http://aksenov.freeshell.org/sdist.html>

von Mises distribution: Notebook available at  
<http://mathworld.wolfram.com/vonMisesDistribution.html>

Loess statistics: Package available at  
<http://www.verbeia.com/mathematica/mathecon/othercode.html>

Logistic regression: Package available at  
<http://library.wolfram.com/infocenter/MathSource/706/>

Pearson and Kolmogorov–Smirnov tests: Package available at  
<http://library.wolfram.com/infocenter/Articles/1379/>

I expect that many more of the holes identified in the current survey  
have already been filled.

Cheers,  
Paul

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