

cern.mad Digest

❑ Output commands for MAD-9

Presently “printer listing”.

- (This changed last week, LHCSampleJob.mad updated accordingly!)

Propose TFS as default with option that can be set permanently.

❑ MAD-9 Documentation (Chris)

Bug page created.

User’s guide updated and extended.

All available from usual MAD home page:

`http://wwwslap.cern.ch/~fci/mad/mad_home.html`

Classic TWISS command

□ Mathematics now clear from Chris.

Forced block-diagonalisation of the matrix of eigenvectors.

Now documented in MAD9 manual.

$$E = \begin{pmatrix} E_{11} & E_{12} & E_{13} \\ E_{21} & E_{22} & E_{23} \\ E_{31} & E_{32} & E_{33} \end{pmatrix} = RW = \begin{pmatrix} r_1 I & R_{12} & R_{13} \\ R_{21} & r_2 I & R_{23} \\ R_{31} & R_{32} & r_3 I \end{pmatrix} \begin{pmatrix} W_1 & 0 & 0 \\ 0 & W_2 & 0 \\ 0 & 0 & W_3 \end{pmatrix}$$

□ Does give “coupled” Twiss functions (more than Courant-Snyder).

Breaks down in cases of complete emittance-exchange, etc.

□ Dispersion function obtained from 6th column.

□ *Not quite* Edwards-Teng.

Edwards-Teng difficult to extend to 3DOF.

MAD9 Performance

❑ Simple performance analysis package almost ready

Frequency of usage of each MAD9 command in a job.

Total CPU time spent in each MAD9 command

Average CPU time for each command.

Breakdown into nested levels of commands.

- e.g. by CALL file and MAD module

Possible to aggregate over many jobs, etc.

❑ First results suggest that overheads for table transformations are not large.

Madtomma development

□ Propose simplified interface to mfs data objects.

```
mfsInterpret["tfsFileName"]
```

will generate several objects with standard symbolic (or MAD ASCII) names, e.g. from a TWISS object

$$\text{NAME}, \beta_x, D_x, Q_x$$

Note that β_x etc. would be lists (“vectors”), one value for each element.

These can then be combined symbolically in the Mathematica environment, e.g.,

$$\frac{\beta_x}{\sqrt{D_x}} \exp(2\pi i \mu_x)$$

to produce other vectors, scalars, matrices, etc.

A little less general than existing framework since user will be responsible for knowing which mfs data object β_x came from.

Similar to automatic naming of ranges in Excel that already exists for MAD output.

MAD9 developments

❑ MAD9 discussion group: cern.mad

Please use it for discussion, proposals, questions, not bugs.

❑ MAD resources Web page

Link from usual MAD home page:

`http://wwwslap.cern.ch/~fci/mad/mad_home.html`

Please contribute!

❑ Basic MAD9 job for LHC Version 6.-2

`/afs/cern.ch/user/j/jowett/public/MAD9/Testing/LHCsampleJob.mad`

No errors yet.

❑ Upgrade of Madtomma 'Mfs packages

Work for MAD8 *and* MAD9.

New features for combining tables (e.g. SURVEY and TWISS, ...).

Simple example in:

`/afs/cern.ch/user/j/jowett/public/MAD9/Testing/MAD9TableTest.nb`

Currently going on ...

❑ Timing tests of various commands

E.g., to check overheads for TWISS3

❑ Checking of equivalence of results from MAD8 and MAD9

Via mfs packages

- TWISS, EIGEN, (TWISS3)
- Tracking
- STATIC and Chromaticity

❑ STATIC

Quick access to chromaticity etc.