TWISS testing

Procedure

/afs/cern.ch/user/j/jowett/public/MAD9/TwissTest/CompareTwiss.nb

Setup for automated comparison using equivalent *parametrised* template input files that should be equivalent for MAD8 and MAD9, e.g. fairly standard LHC job

- MAD8

```
ON_ORBIT        := <*OnOrbit*>;
ON_NONLINEAR    := <*OnNonlinear*>;
…  …
OPTICS,DELTAP=<*deltap*>,filename=<*MAD8twiss*>,&
```

- MAD9

```
Const ON_ORBIT     = <*OnOrbit*>;
Const ON_NONLINEAR = <*OnNonlinear*>
p0=450;
Beam1: Beam, particle=proton, pc=p0*(1+<*deltap*>);
```

Further example templates for interesting cases

TWISS, TWISSTRACK, etc.

Please contribute. Needs errors later.

Deviations for deltap=0.005

Global parameter	MAD8	MAD9	MAD8-MAD9	fractional error
CIRCUM	26658.864	26658.864	1.681×10^{-9}	6.3×10^{-14}
Q1	63.28515936	63.28957889	-0.00442	-0.00007
Q2	59.31464612	59.3100378	0.004608	0.000078

Optical function	MAD8-MAD9 correlation
ALFX	1.
ALFY	1.
BETX	1.
BETY	1.
DPX	0.937
DPY	Indeterminate
DX	0.861
DY	Indeterminate
MUX	1.
MUY	1.
PXC	1.
PYC	Indeterminate
S	1.
XC	1.
YC	Indeterminate