

AT 2.0 Manual

July 24, 2013

Abstract

We give an overview for the AT 2.0 code and describe how the functions and repository fit into this.

1 Introduction

2 Lattice Creation

The element creation functions are the following:

- `atdrift` Class: Drift
- `atmonitor` Class: Monitor
- `atmultipole` Class: Multipole
- `atthinmultipole` Class:
- `atquadrupole` Class: Quadrupole
- `atrbend` Class: Bend
- `atrfcavity` Class: RFCavity
- `atsbend` Class: Bend
- `at solenoid` Class: Solenoid
- `atsextupole` Class: Sextupole
- `atwiggler` Class: Wiggler
- `idtable` Class: KickMap

3 Pass Methods

- BndMPoleSymplectic4E2Pass
- BndMPoleSymplectic4E2RadPass
- BndMPoleSymplectic4Pass
- BndMPoleSymplectic4RadPass
- BendLinearPass
- CavityPass
- CorrectorPass
- DriftPass
- QuadLinearPass
- QuadMPoleFringePass
- StrMPoleSymplectic4Pass
- StrMPoleSymplectic4RadPass
- ThinMPolePass
- WiggLinearPass
- IDTablePass

4 Lattice Manipulation

A lattice manipulation function takes a lattice as an argument and produces a new lattice as a result.

An important kind of operation is where one selects all elements of a certain kind and does a transformation on them. The Class definitions facilitate this kind of operation. We define the following classes:

- Bend
- Quadrupole
- Sextupole
- Wiggler
- KickMap

5 Tracking Particles plus Moments

The pass methods have two different calling methods. They may be called directly via the Mex interface, or they may be called indirectly through the function RingPass().

The moment tracking and equilibrium finding occurs via the function OhmiEnvelope()

6 Lattice Functions

Given the ability to track particles through the lattice, one can compute beam dynamics properties around the ring. The closed orbit, or fixed point of stable motion is one example. Next there are the various ways to characterize the betatron and synchrotron oscillations. Twiss parameters plus various coupled generalizations may be computed.

7 Visualization

The lattice functions described in the previous section may be plotted, together with a synoptic representation of the lattice. The function atplot is designed for this purpose.

8 AT within a larger context: Other Codes, Matlab Middle Layer

References

- [1] A. Terebilo *Accelerator Toolbox for Matlab*, SLAC-PUB 8732 (May 2001)