PS/DI Note 96-02 (Min.)
24 January 1996

Minutes of ABS meeting held on 9 and 23 January, 1996

Topics of January 9: Table structures. Linac to PSB transfer line.
Present: B. Autin, V. Ducas, M. Lindroos, A. Lombardi, H. Schonauer, E. Wildner.

Topics of January 23: Selector. Programs integration.
Present: B. Autin, F. Di Maio, V. Ducas, G.H. Hemelsoet, A. Kazymov, O. Jensen, M. Lindroos, M. Martini, O. Tungesvik, V. Vicente, E. Wildner.

1. Table structures (A. Kazymov, M. Lindroos)

The tables will be re-composed to limit the number of attributes per class of elements and to be easier to fill. The classes are: Machine layout, dipoles specifications, dipoles in situ properties, quadrupoles specifications and quadrupoles in situ properties. The specifications are related to the engineering properties (weight, number of turns of the coils, etc.), the in situ properties are relevant to beam optics. Discussions at and after the meetings have led to the following decisions:
1. No redundancy in attributes.
2. The in-situ properties are energy independent.
3. In the same way a nominal bending angle is defined for dipoles, a nominal focusing strength is defined for quadrupoles.
4. The attribute *Description* will be a keyword for element recognition in the correction programs.

2. Selector (V. Ducas)

In its present status, the selector sorts a number of data (not all) out of the ORACLE data base and presents them in the right input form to *BeamOptics*.This is a major step which includes the treatment of data in PL/SQL language, a C program for the conversion of the raw data into input data and a *MathLink* procedure for the link with *Mathematica*. In brief, the user who wants to invoke the data base and study the machine properties with *BeamOptics* has only to type

Selector[machine,sector]

from within a *Mathematica* session; *machine* is the machine name and *sector* a subset of the machine. The format of the input data for *BeamOptics* will be updated with two extra columns: one will contain the *Descriptor* attribute, the other the calibration factor $\int x\,dl\,/\,I$ where x is either a field B, a gradient G, etc.

3. Programs integration (E. Wildner)

The recent developments in correction programs concern the decoupling and the generalization of the various tasks. Each correction is characterized by a matrix which is created off-line with the command

CorrectionMatrix[dblist,type,fn]

where *dblist* is the input data provided by the selector and *type*, the type of correction to be performed (steering, closed orbit, chromaticity,etc.). It returns for each plane, horizontal and vertical, a list of three elements:

1. The correction matrix,
2. The list of monitors,
3. The list of correctors.

This output will be stored in a *Mathematica* file *fn*.

The correction program is directly called by the application program and has the syntax

Correction [fn,b,n,mv,cv]

where *fn* is the name of the file where the output from *CorrectionMatrix* has been stored, *b* is the list of the measurements at the validated monitors *mv*, *n* is the iteration order of the correction and *cv* the list of validated correctors. The function returns a list of three components:

1. The *n* r.m.s. values of the residual observations.
2. The *n* couples of correctors with their correction values.
3. The *m* couples of monitors with their residual observations.

Monitors and correctors are given by their names.

The application programs cannot be entirely generic because the measurement technology is not standard and machines may be too dissimilar. However, they can be split in a customized part which takes the peculiarities of the application into account and a generic part which fits the unified treatment of a correction. Furthermore, the "look and feel" of the graphics interface is to be as uniform as possible.

4. Linac to PSB line (A. Lombardi, E. Wildner)

The optics of the transfer line has been designed to contain the beam envelope under the effect of strong space charge forces. The steering of the beam concerns the beam centroid and is largely space charge independent. The first theoretical analyses show that the steering is anomalously sensitive, which corroborates experimental suspicions. The correction coefficients are being established by independent programs to eliminate any calculation error. If the present results are confirmed, it would become necessary to revise the optics to ensure a correct beam envelope and beam steering as well.

Next meeting

Tuesday, February 6, 1996 at 16 hr in Large PS Conference room
Agenda: Table structures, by A. Kazymov
Linac line, by A. Lombardi and E. Wildner

Bruno Autin

Distribution: ABS team, PS/DI group, Group Leaders,
G. de Rijk (SL), J. Schinzel (AT)