

**Application of Symbolic Techniques to Structural Beam Optics**, B. AUTIN, J.P. KOUTCHOUK and E. WILDNER, CERN - The architecture of an accelerator, or a storage ring, should be as modular as possible to make the machine cost-effective, easy to understand and simple to run. Many different types of modules, from lattice periods to insertions, are used but their theory rarely exists. The reason lies in the complexity of the calculations which involve heavy matrix multiplications and solving high degree algebraic equations. Expertise and numerical techniques are thus the usual approach to get an acceptable machine design but as yet basic questions such as the existence and uniqueness of a solution are not addressed. These drawbacks can be remedied by using symbolic programs which relieve the designer from the analytical computing task and may help him in finding special cases of elegant simplicity. The treatment of orbits and betatron oscillations by a symbolic program is described and an application to low  $\beta$  insertions for muon and proton colliders is given.