Trajectory and Optical Parameters in a Nonlinear Stray Field, D. MANGLUNKI, <u>M. MARTINI</u>, CERN, I. KIRSTEN, Heidelberg University - A new optics for the main CERN Proton Synchrotron (CPS) magnet is modelled to allow a precise description of the ejected beams. For that purpose, field maps of the magnet have been measured for the various operational current settings. They include the central field, the end stray field and the lateral stray field. In order to get a functional form which can be inserted in the equations of motion for a charged particle in a magnetic field, the discrete field maps are converted into bi-dimensional polynomials of degree up to ten. These equations of motion can be written as a set of four first order differential equations which are solved simultaneously. Two of them are non-linear and describe the centroid motion, the other two are linear and apply to the betatron motion. The method has been validated by producing extraction conditions which have been verified experimentally with the 26 GeV/c beam for the future LHC.