Summary

The particular advantages of planetary gears are in their high power density and coaxial design; therefore they are used in many domains of mechanical engineering. For a long time, corrections of toothing have been deployed in order to increase the power density. Up to now, corrections have been made for a certain operating state, however, as the loads vary in practice, the calculation processes are not sufficient any more. Therefore, it is imperative that corrections of toothing for the load spectrum are defined. Such correction should achieve a highest possible load capacity of tooth bending or surface. The bearing forces result from the corrections on the gears, as in every stage of the load spectrum exists various load distribution. From the exterior load spectrum on the planetary gears results a changed load spectrum on bearings, which permits a more precise estimation of bearing life.

The extension of the program system PlanKorr enables to determine a tooth correction and also bearing forces in planetary gears for any load spectrum. With the optimally calculated correction for the particular load spectrum it is possible to minimize the damage. Depending on the applied tooth correction, the bearing forces can be calculated for every stage of the exterior load spectrum. Furthermore, the forces can also be composited to one load spectrum on bearings. This load spectrum subsequently provides the foundation for a precise calculation of bearing life.

In order to better evaluate the effects of various correction forms, which are mostly used in practice, on the load behaviour at load spectrum, tests were made on a test rig within this thesis. The experimental results enable a verification of the extended program system.