Präzisionswuchtvorrichtung für hochdrehende Maschinenteile

II. Abstract

When the possibility of a diploma project was offered to us we choose the construction and manufacturing of a test facility to detect and eliminate unbalances from/of high spinning symmetric components. The original idea was to counterbalance one specific component, but it soon became clear that we would extend our aim into a more difficult and ambitious direction.
The decision was to implement software which should be able to detect the optimum position for the positive compensation of masses. For the determination of this angle for position, a light ‑ barrier is used to measure the rotational speed. Additionally, the test facility should give the users information about how much mass they have to use to accomplish the optimal concentric running. It should be possible to counterbalance the given part so that it can find its range of use in machines which are running with up to 120.000 rpm. This is obtained by several fourier transformation and bandpass filtering, which is used to eliminate deranging signals which are added by several factors of the driving system and surrounding influences.

To calibrate the test facility a reference shaft has to be factored with
a tolerance of less than 0.01 mm. This is probably one of the most ambitious parts of the project, because the shaft has to be extremely precise. The realization of the project required the preparation of different fine mechanical precision parts and mechanical and electronic experimental setups. The theoretical background of the project involves topics from mechanics, physics, electronics and mathematics, from which we could draw ourselves completely specific, valuable training and knowledge conditions.
Over and above, we want to make sure that every interested person can rebuild the attachment, as long as they have a basic knowledge in engineering.