双压力角非对称齿轮轮齿接触分析　Tooth Contact Analysis for Unsymmetric Gear with 　Double Pressure Angles

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关键词：　　齿轮传动 轮齿接触分析 双压力角 非对称齿廓 传动误差

摘　要：　　对双压力角非对称齿轮在修形和误差条件下的啮合过程进行了全面推导，并编制了轮齿接触分析(TCA)计算机数值仿真程序。通过对非对称齿轮与标准对称齿轮进行仿真计算，得出双鼓形非对称齿轮在有安装误差的情况下，接触迹的偏移量比标准对称齿轮小，传动误差的幅值比标准对称齿轮有明显降低，因此具有良好的传动平稳性和较高的承载能力。In order to increase load capacity and reduce weight, size and vibration level of gear transmission system, a new-style unsymmetric gear with different pressure angles was designed. Modification of pinion geometry could reduce the transmission errors and achieve a more favorable shape for the function of transmission errors. The process of meshing and contact for unsymmetric gear with double pressure angles in case of modified geometry and transmission errors was proposed. Computer programs of tooth contact analysis (TCA) of unsymmetric gear and conventional gear were developed. Two versions of modified geometry were investigated and compared with numerical examples. The results showed that the displacement of contact path of unsymmetric gear was smaller than conventional symmetric gear where alignment errors exist, and the function of transmission errors for unsymmetric gear was indeed a continuous parabolic one with a reduction in magnitude. It was proved that involute gear with unsymmetric tooth could efficiently improve transmission stabilization and load capacity of tooth surface.

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