弧面凸轮廓面非等径加工的刀位控制方法 Cutter Location Control Method for Unequal Diameter Machining of Globoidal Cam Surface

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关键词： 弧面凸轮 非等径加工 法向误差 刀位优化

摘 要： 刀位补偿法是非等径加工弧面凸轮廓面最常用的方法，提出了刀位补偿法法向误差计算的方法和一种刀位自适应补偿优化算法，即对于任意凸轮转角，以最大法向误差最小为目标函数，进行刀位优化，寻求对应的最佳补偿点和补偿量，使刀位根据加工误差自适应地柔性补偿。通过实例验证了法向误差计算式的有效性，并得出了滚子和刀具的半径差是最佳补偿量，而最佳补偿点位置并不固定的结论，结果表明所提出的刀位优化算法正确有效，可显著减小加工误差。 The cutter location compensation method is often used for unequal diameter machining of globoidal cam surface. A new calculation method for the normal error is developed, and a self-adaptive cutter location compensation optimization algorithm is proposed, whose objective is to minimize the maximal normal error. This algorithm can find out the best compensation direction and value by the cutter location optimization for any cam rotation angle and make the cutter location self-adaptive and flexible compensation according to the machining error. The normal error calculation formula has been proved to be valid by an example. A conclusion has been drawn that the radius difference between the cutter and the roller is the best compensation value and the best compensation direction is not fixed. The results show that the correctness and effectiveness of the improved self-adaptive compensation method have been proved and machining errors can be evidently reduced.

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