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高阶椭圆锥齿轮齿形设计与加工

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摘要:
根据齿轮空间啮合原理,分析了范成法生成高阶椭圆锥齿轮齿廓过程中,范成刀具的空间走刀位置;建立了高阶椭圆锥齿轮齿廓的数学模型,推导出了高阶椭圆锥齿轮的齿面方程,得到了高阶椭圆锥齿轮副的虚拟实体及装配模型;探讨了采用五轴联动数控机床加工高阶椭圆锥齿轮的方法,通过高阶椭圆锥齿轮的加工与啮合试验,对高阶椭圆锥齿轮理论传动比与实际传动比进行了对比分析,验证了范成法生成高阶椭圆锥齿轮齿廓模型的正确性,以及采用五轴数控机床加工高阶椭圆锥齿轮的可行性。

关键词:
锥齿轮 非圆锥齿轮 范成法 齿面方程

Tooth Profile Design and Manufacture of Higher-order Elliptical Bevel Gears

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Abstract:
Based on the space engagement theory, the space position of cutter was analyzed when the tooth profile of a higher-order elliptical bevel gear was generated, a mathematical model of higher-order elliptical bevel gear's tooth profile was established; and then tooth surface equation of higher-order elliptical bevel gear was derived, pseudo-entity and assembly model of higher-order elliptical bevel gear were also acquired. Manufacturing methods by five-axis CNC of higher-order elliptical bevel gear were discussed, by the processing and mesh experimental research of a higher-order elliptical bevel gear pair, comparisons between experimental results and theoretical analysis was made to verify the mathematical model of higher-order elliptical bevel gear's tooth profile, and the feasibility of processing methods shows the processing methods can be used in the actual machining.

Keywords: bevel gear;noncircular bevel gear;gear generating;tooth surface equationzz')" href="#">
bevel gear;noncircular bevel gear;gear generating;tooth surface equation

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