

可適用於多樣式齒輪種類之參數式網格模式產生方法

黃國饒, 張文瑞, 蘇信維

機械工程學系

工學院

kjhuang@chu.edu.tw

摘要

This paper presents an approach to generating high quality 2D/3D mesh elements applicable to a wide variety of gear types when using continuous geometry models for investigation gear static or dynamic responses. Firstly, the profile equations of a transverse section of a rack cutter are derived. Then, using the homogenous transformation matrix and the equation of meshing for gears, the equations of involutes, fillets, and addendum chamfers for the gear teeth are obtained that can simultaneously incorporate the geometry models of spur and helical gears or straight and spiral bevel gears. Next, no requirement of CAD models, the mesh elements of the gear models are directly generated after the calculations of the nodal coordinates of mesh elements using the profile equations via a C code. Finally, the gear models with nodes and elements are exhibited using the software FEM. Many gear mesh models have demonstrated the effectiveness, efficiency, and correctness of this approach. Not only the mesh generation of wide varieties of gear types, but also the high flexibility of adjustment of gear design parameters, profile modifications, or backlash clearance as well.

關鍵字：gear, profile modification, FEM, node, element mesh