the introduction of transmission principle of instantaneous constant contact ratio gears, to explore a new way to improve the gears meshing quality and transmission performance.

Straight gear transmission designed by any non-integer contact ratio gears, when gear transmission conditions meet the instantaneous constant contact ratio, how to configure corresponding stepped gears? For gears transmission of different types of tooth profile, in addition to the stepped tooth, which gears structure are there to meet the transmission conditions of instantaneous constant contact ratio? What are the tooth profile shapes? At the same time, how to establish the relationship between the geometric parameters and kinematic parameters in the gear transmission of the instantaneous constant contact ratio, to solve kinematic parameters design, to solve structure styles of different types gears transmission, manufacturing method and process. How to create dynamics model of gears transmission of the instantaneous constant contact ratio, meshing stiffness and transmission stability of gears transmission are analyzed, compared and evaluated, provide a theoretical basis in solving the gear shock, vibration and noise problems by the principle. In addition, the errors of addendum and center distance will change contact ratio gears transmission, how to analyze and assess the effect of the errors of addendum and center distance on the transmission performance, to explore solutions to compensate the error influence, to analyze the issues involved adaptability of stepped gears to changes of axial stiffness, progressive meshing performance discreted gears and average loads on the gear tooth, these new issues are will be resolved based on the new principle during the gear meshing transmission.

IV. CONCLUSION

This study proposes the gear transmission principle of instantaneous constant contact ratio, by solving meshing alternating chance of single-double teeth pairs, suffered loads of each tooth is constant in the process of meshing transmission, meshing stiffness fluctuation of the gears tooth is smaller, undoubtedly, the gears transmission stationarity will be greatly enhanced, this is a new concept to solve the issues ,such as a shock, vibration and noise during the high-speed heavy gear transmission. Although the structure of the stepped gear is mentioned in some literatures, but they are two completely different concept and purpose with the study. The gear transmission meshing principle based on instantaneous constant contact ratio, no related research is reported at home and abroad, the study of this problem is not only to explore new theoretical problem for the gear transmission, and based on the study ,the related issues can be expanded, have important theoretical significance and academic value. Applying to the principle and combining existing research results, new technology of high-performance gear transmission is expected to develop with independent intellectual property rights, to improve the international competitiveness of gears manufacturing technology and equipment manufacturing industry in our country, undoubtedly, this is a research topic of both academic value, but also important practical significance and application prospects.

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