

Direct Gear Design for Symmetric and Asymmetric Gears

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1. Introduction

- Alex Kapelevich Background
- AKGears Introduction

2. Historical Overview

- Direct Gear Design Origin
- Gear Design Based on Rack Generating Technology
- Definition of Direct Gear Design
- Brief History of Asymmetric Tooth

3. Macrogeometry of Involute Gears

- Involute Tooth Parameters
- Gear Mesh Characteristics
- Direct Gear Design for Different Types of Involute Gears

4. Area of Existence of Involute Gears

- Area of Existence of Symmetric Tooth Gears
- Area of Existence of Asymmetric Tooth Gears
- Application of Area of Existence

5. Involute Gearing Limits

- Number of Teeth
- Pressure Angle
- Contact Ratio
- Practical range of involute gear parameters

6. Tooth Geometry Optimization

- Involute Profile Optimization
- Asymmetry Factor Optimization
- Tooth Modeling and Bending Stress Calculation
- Root Fillet Optimization Technique

- Conversion of Root Bending Stress Reduction to other Performance Benefits
- Tooth flank modification optimization
- Contact ratio optimization

7. Rating of Asymmetric Gears

- Rating of Spur Gears
- Rating of Helical Gears

8. Direct Gear Design Software Demonstration

9. Special Direct Gear Design applications

- High Gear Ratio Planetary Drives
- Self-locking Gears
- Plastic Gear Design Specifics

10. Gear Fabrication Technologies and Tooling

- Gear Machining and Tooling
- Gear Forming and Tooling

11. Measurement Asymmetric Tooth Gears

12. Analytical and Experimental Comparison of Symmetric and Asymmetric Tooth Gears

13. Implementation of Directly Designed Gears

14. AKGears' Software

- Tooth Root Fillet Optimization
- Spline Interpolation and Tangent Arc Approximation
- Pin / Ball & Span Gear Measurement

Questions and Answers