

Search Journal of Mechanical Design

SEARCH

ADVANCED
SEARCH

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS


[Home](#) [Journals](#) [Conference Proceedings](#) [eBooks](#) [Topic Collections](#) [Library Service Center](#) [Faculty Positions](#) [Help](#)
[Journal of Mechanical Design](#) [Journal Home](#) [Newest Issue](#) [All Issues](#) [Accepted Manuscripts](#) [Publish Ahead of Print](#)

Journal of Mechanical Design | Volume 138 | Issue 8 | research-article

[← PREVIOUS ARTICLE](#) [NEXT ARTICLE →](#)

Research Papers: Design of Direct Contact Systems

Meshing Efficiency Analysis of Two Degree-of-Freedom Epicyclic Gear Trains

Essam Loubi Esmail

[1] Author and Article Information

J. Mech. Des. 138(8), 083301 (Aug 18, 2016) (7 pages)

Paper No. MT-16-1034; doi: 10.1115/1.4033603

History. Received January 15, 2016; Revised May 20, 2016

Some tools below are only available to our subscribers or users with an online account.

PDF
Share
Get Alerts

Email
Get Citation

Related Content

Customize your page view by dragging and repositioning the boxes below.

Related Journal Articles

Filter by Topic >

Design of Multiple Operating Degree-of-Freedom Planetary Gear Trains With Variable Structure

J. Mech. Des. (September, 2015)

Power Efficiency of the Rotational-to-Linear Infinitely Variable Cobotic Transmission

J. Mech. Des. (December, 2007)

Complete Efficiency Analysis of Epicyclic Gear Train With Two Degrees of Freedom

J. Mech. Des. (July, 2012)

[+] View More

Related Proceedings Articles

Filter by Topic >

Analytical and Test Evaluation of Planetary Gear Train Efficiency (Torque Related Losses) With Multiple Power Flow Arrangements

JLTCXLE2000 (2000)

Hybrid Transmission for Mobile Robot

JLTCXLE2010 (2010)

Multi-Freedom Planetary Transmission Scheme Based on Graph Theory of Topological Synthesis

JLTCXLE2015 (2015)

[+] View More

Related eBook Content

Understanding the Problem Design and Application of the Worm Gear- Chapter 12

Materials

Design and Application of the Worm Gear- Chapter 1

Backlash

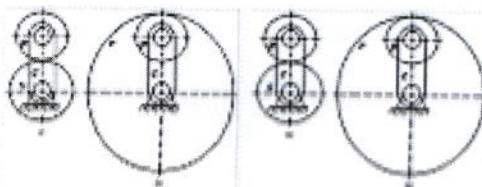
ARTICLE | REFERENCES | FIGURES | TABLES

Abstract

Abstract | Introduction | Torque and Power Analysis of a GPE | Efficiency of 1DOF GPEs | Efficiency of 2DOF GPEs | Conclusions | Nomenclature | References

The concept of potential power efficiency is introduced as the efficiency of an epicyclic gear train (EGT) measured in any moving reference frame. The conventional efficiency can be computed in a carrier-moving reference frame in which the gear carrier appears relatively fixed. In principle, by attaching the reference frame to an appropriate link, torques can be calculated with respect to each input, output, or (relatively) fixed link in the EGT. Once the power flow direction is obtained from the potential power ratio, the torque ratios are obtained from the potential power efficiencies, the particular expression of the efficiency of the EGT is found in a simple manner. A systematic methodology for the efficiency analysis of one and two degree-of-freedom (DOF) EGTs is described, and 14 ready-to-use efficiency formulas are derived for 2DOF gear pair entities (GPEs). This paper includes also a discussion on the redundancy of the efficiency formulas used for 1DOF GPEs. An incomplete in the efficiency formulas in previous literature, which make them susceptible to wrong application, is brought to light.

FIGURES IN THIS ARTICLE



Copyright © 2016 by ASME

Topics: Torque, Flow (Dynamics), Planetary gears, Energy efficiency, Degrees of freedom, Gears, trains

Purchase this Content

\$25.00

Purchase

Learn about subscription and purchase options