

## Investigation of Dynamic Characteristic of Planetary Gear Set Based On Three-Axes Torque Measurement

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**Abstract :** A planetary gear set is widely used in hybrid vehicles as the power distribution system or in electric vehicles as the high reduction system, but due to its complexity with planet gears, its dynamic characteristic is not fully understood. There are many reports on two-axes driving or displacement of the planet gears under these conditions, but only few reports deal with three-axes driving. A three-axes driving condition is tested using three-axes torque measurement and focuses on the dynamic characteristic around the planet gears in this report. From experimental result, it was confirmed that the transition forces around the planet gears were balanced and the torques were also balanced around the instantaneous rotation center. The meshing frequency under these conditions was revealed to be the harmonics of two meshing frequencies; meshing frequency of the ring gear and that of the planet gears. The input power of the ring gear is distributed to the carrier and the sun gear in the dynamic sequential change of three fixed conditions; planet, star and solar modes.

**Keywords :** dynamic characteristic, gear, planetary gear set, torque measuring

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