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21.03.2012

Ankündigung eines Gastvortrages

zum Thema

Mechanical models for improving the Frictional Torque Control in Automated Dry-clutch for AMTs and DCTs

Termin: **Mittwoch, 27. Juni 2012, 16:15 Uhr**

Ort: **Technische Universität Berlin**
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Gastdozent:

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Abstract:

Dry clutches are widely used in conventional and innovative automotive drivelines and represent a key element for automated manual transmissions (AMTs) as well as the more recent dual-clutch architectures (DCTs).
For market sectors such as large-series and ecological cars, AMT offers the advantage of lower weight and higher efficiency with respect to other typologies of automatic transmissions. Furthermore, an AMT is directly derived from a manual one through the integration of actuators; thus, development and production costs are generally lower than other automatic transmissions, while the reliability and durability are at highest level. For high class sport cars, vehicle dynamic performances and driving quality can be strongly improved with respect to automatic transmissions.
The operating modes of AMTs are usually two: semiautomatic, with the driver requesting a sequential gear shift by means of a proper interface or fully automatic.

In both cases, after the gear shift input, the TCU manages the shifting steps through suitable signals to the engine, the clutch assembly and the gearbox, according to current engine regime, driving conditions and selected program. The quality of the vehicle propulsion as perceived by the driver is largely dependent on the quality of the control strategies.

In practical applications, it is essential to model the clutch behaviour through its torque transmissibility characteristic, i.e., the relationship between the throwout bearing position and the torque transmitted through the clutch during the engagement phase. In fact, sensitivity analyses on control schemes for AMTs have shown that uncertainties in clutch torque characteristic can severely affect the performance of the clutch engagement.

The seminar will introduce an overview of the modelling work on the torque transmissibility of dry clutches developed at Dept. of Industrial Engineering of the University of Salerno in collaboration with the Control Engineering group at University of Benevento.

In this context, it has been analyzed how the transmissibility characteristic depends on: friction pads geometry, cushion spring compression, cushion spring load, and slip-speed-dependent friction. Corresponding functions have been suitably composed determining the torque transmissibility expression. An experimental procedure for tuning the characteristic parameters has been also studied. The clutch-torque transmissibility cosimulation model together with a typical AMT controller and their results will be discussed.

Some outcomes regarding the temperature influence will be also underlined. In particular, the studied effects concern the temperature influence on the frictional behaviour of the clutch facings, the throwout bearing characteristic positions, the cushion spring load-deflection curve.