

Formulation of Optimal Shifting Sequence for Multi-Speed Automatic Transmission

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Abstract : The most important component in an automotive transmission system is the gearbox which controls the speed of the vehicle. In an automatic transmission, the right positioning of actuators ensures efficient transmission mechanism embodiment, wherein the challenge lies in formulating the number of actuators associated with modelling a gearbox. Data with respect to actuation and gear shifting sequence has been retrieved from the available literature, including patent documents, and has been used in this proposed heuristics based methodology for modelling actuation sequence in a gear box. This paper presents a methodological approach in designing a gearbox for the purpose of obtaining an optimal shifting sequence. The computational model considers factors namely, the number of stages and gear teeth as input parameters since these two are the determinants of the gear ratios in an epicyclic gear train. The proposed transmission schematic or stick diagram aids in developing the gearbox layout design. The number of iterations and development time required to design a gearbox layout is reduced by using this approach.

Keywords : automatic transmission, gear-shifting, multi-stage planetary gearbox, rank ordered clustering

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