A geometrical approach to fully variable valve control

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Variable valve timing (VVT) and variable valve lift (VVL) are used to improve the performance, fuel economy and emissions of a combustion engine. In the last few decades these issues became more and more important. Here we shall address both types VVT and VVL and subsume them in the concept of *variable valve control* (VVC). The first efforts in VVC in a combustion engine were made in the late 1950s and in the 1960s. Not before 1980, though, they were applied in a production car. It was in the late 1980s when the first company introduced some sort of variable valve control on a large scale. Today each automobile manufacturer has his own approach to variable valve control. The outcome is very much of the same kind: Two differently shaped cam lobes are applied by turns, depending on the rev range or on other parameters. Additionally, the whole camshaft can be twisted by a few degrees to allow earlier valve opening (and closing) in the high rev range.

We suggest a new approach to fully variable valve control by means of geometrical and kinematical methods. For a given set of cam lobes we create an appropriate cam surface which is slidable along the camshaft. This cam surface does not only respect the prescribed cam lobes but also accomplishes a continuous set of them.

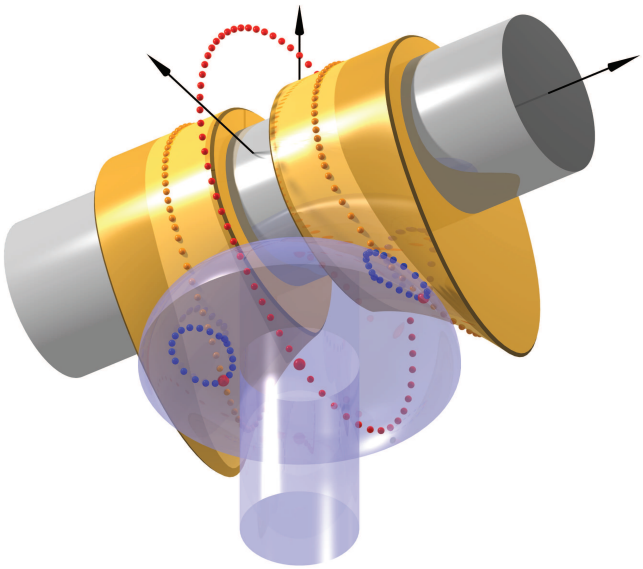

Figure 1: The suggested cam mechanism