

Abstract

A review of the various engine thermal management strategies developed over the years is presented in this paper. The conventional cooling system of the engine consists of passive components with many constraints on them which limit the engine to operate at its full potential. Also, the design of the conventional cooling system is bulky and can be compacted by adopting new features which are presented in this paper. Over the years, the various components of the cooling system have been reviewed and have been replaced with electronically controllable components which provide independent control over its operation with quick response time and less parasitic loss. Apart from this, the design of the cooling system has been modified with the introduction of various cooling strategies like split-cooling, precision cooling, reverse cooling and ultimate cooling strategies which reduces the coolant mass and makes the system much more compact. Engine thermal management system also interacts with the combustion process which provides another parameter for engine calibration. Also, the interaction of engine thermal management system with lubricating oil has been studied and its effect on the friction characteristic of the engine. Control of the engine temperature with engine thermal management system provides a means to reduce the engine friction with reduced fuel consumption and reduced emissions.