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Regulatory efficiency requirements for electric machines and tremendous price rise in material costs of permanent magnets are a two important motivators for analyzing the thermal performance of electric machines in greater detail. SPEED offers thermal circuit simulations to look at component temperatures during drive cycle load conditions. This is a typical thermal simulation approach for small and medium size machines. For large machines a complete CAD model needs to be built and multiphase flow calculations are performed. A process where we can now offer a more streamlined simulation approach by combining SPEED and STAR-CCM+.

As one of the first steps to facilitate data transfer between the two codes, CD-adapco has built import capabilities for STAR-CCM+ to read the SPEED geometry descriptions as well as the loss density distributions to use as heat sources in the flow, thermal and stress simulation in STAR-CCM+. This presentation will display the process of joint simulation work in SPEED and STAR-CCM+ with several examples to show the benefit of such simulations. An important next step is the generation of end windings to a given specification, a feature that is currently in developments in SPEED and STAR-CCM+. This set of capabilities is extended further to facilitate also electromagnetic analysis and finally lead to co-simulation between SPEED and STAR-CCM+.

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