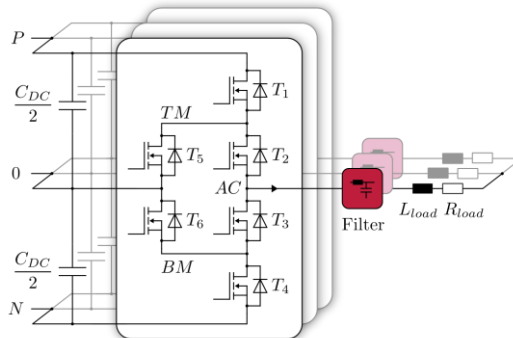


## 3-Level Voltage Source Inverter Filter Design for Electric Aircraft Propulsion Systems

(Master's Thesis, German or English)

Global mobility is increasingly confronted with the social need to significantly reduce air traffic's impact on the environment. With the aim of reducing emissions, intensive research is being carried out into the electrification of aircraft. As a key component, the constantly evolving power electronics contribute significant to achieve this. For the propulsion inverter, multilevel structures, such as the Active Neutral-Pointed Clamped (ANPC) topology are a promising solutions.

Wide Band Gap Power Semiconductor devices lead to high voltage and current slew rates, which can negatively affect both the connected electrical machine (e.g. winding degradation) and EMC aspects. One solution to this problem is the use of motor-side filters at the inverter output. Various configurations, such as a sinusoidal EMC filter, are suitable solutions. The filter significantly influences performance measures of the system (e.g., gravimetric power density), necessitating the optimization of the design process.



For simulation, a simulation model is available in PLECS, which needs to be adapted to the specific requirements of this master thesis. Coupling with MATLAB Simulink is possible.

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