

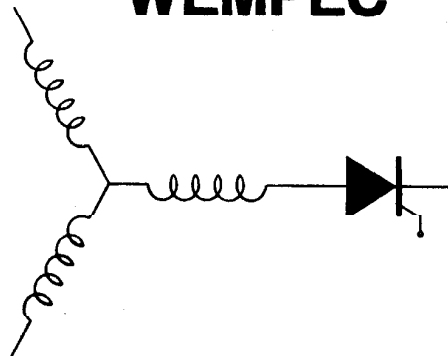
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RESEARCH REPORT
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Study of the Generator/Motor Operation of Induction Machines
in a High Frequency Link Space Power System

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by

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Abstract

Static power conversion systems have traditionally utilized dc current or voltage source links for converting power from one ac or dc form to another since it readily achieves the temporary energy storage required to decouple the input from the output. Such links, however, result in bulky dc capacitors and/or inductors and lead to relatively high losses in the converters due to stresses on the semiconductor switches. This report examines the feasibility of utilizing a high frequency sinusoidal voltage link to accomplish the energy storage and decoupling function. In particular, a new type of resonant six pulse bridge interface converter is proposed which utilizes zero voltage switching principles to minimize switching losses and uses a novel, easy to implement technique for pulse density modulation to control the amplitude, frequency and the waveshape of the synthesized low frequency voltage or current. Adaptation of the proposed topology for power conversion to single-phase ac and dc voltage or current outputs is shown to be straight forward. The feasibility of the proposed power circuit and control technique for both active and passive loads are verified by means of simulation and experiment.

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