中文摘要

鼠籠式感應發電機因爲具有結構簡單且堅固、體積小、成本低、操作簡單及維護容易等優點而非常適合中低容量之風力發電系統，本論文主要發展一自激式鼠籠式感應發電機作爲風力發電系統時之交流/直流電力轉換介面，它是由一三相整流器及一三相虛功激磁系統組成，其中三相整流器用以將感應發電機發出之頻率不固定之交流電能轉換成一直流電能，此直流電能可供給直流負載或經由一直流／交流換流器轉換成固定頻率之電力送回配電系統；由於感應發電機缺乏一個獨立的磁場電路，所以在運轉時須注入一額外的虛功電流作爲激磁調整，以調整感應發電機之輸出電壓，且由於三相整流器連接於感應發電機輸出端，它將產生諧波電流注入感應發電機，這將造成感應發電機之振動，因此三相虛功激磁系統是用以作爲諧波濾除及虛功調整。本論文將建構一三相鼠籠式感應發電機之交流/直流轉換介面之雛形以驗證其功能，而由實驗結果驗證本論文所發展之交流/直流轉換介面具有優異之感應發電機交流輸出穩壓及諧波濾除性能。

英文摘要

The squirrel-cage induction generator has the advantages of rugged construction, simple and reliable operation, less expensive and little maintenance, and it is suitable for small capacity of wind power generation. In this thesis, an AC/DC power conversion interface is developed for the squirrel-cage induction generator used in the wind power generation. The developed power conversion interface is configured by a three-phase rectifier and a three-phase reactive excitation system. The three-phase rectifier is used to convert the AC energy with variable frequency generated form the induction generator to a DC energy, and the DC energy can be supplied to the DC load or converted by a DC/AC inverter to an AC energy with fixed frequency to supply to send to the utility. The functions of three-phase reactive excitation system are to supply the excitation current and filter out the harmonic current. A prototype is established to verify the performance of the proposed power conversion interface for squirrel-cage induction generator. Test results show that the performance of this power conversion interface is excellent.