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**PERMUTATION TEST OF PARTIAL
REGRESSION COEFFICIENTS**

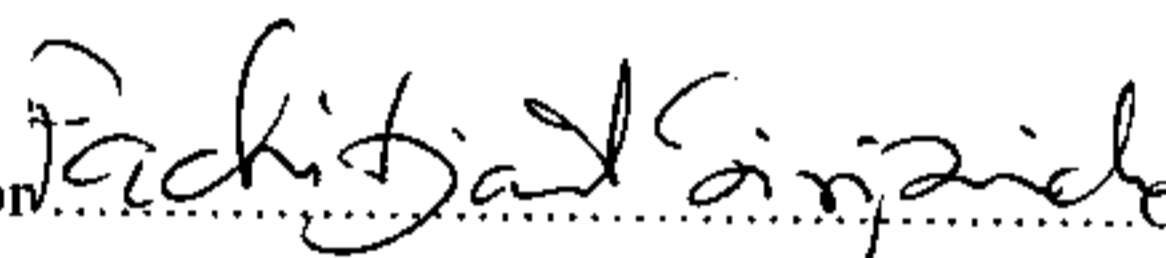
Siriwan Tantawanich


**A Dissertation Submitted in Partial
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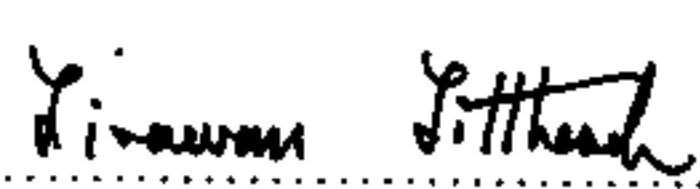
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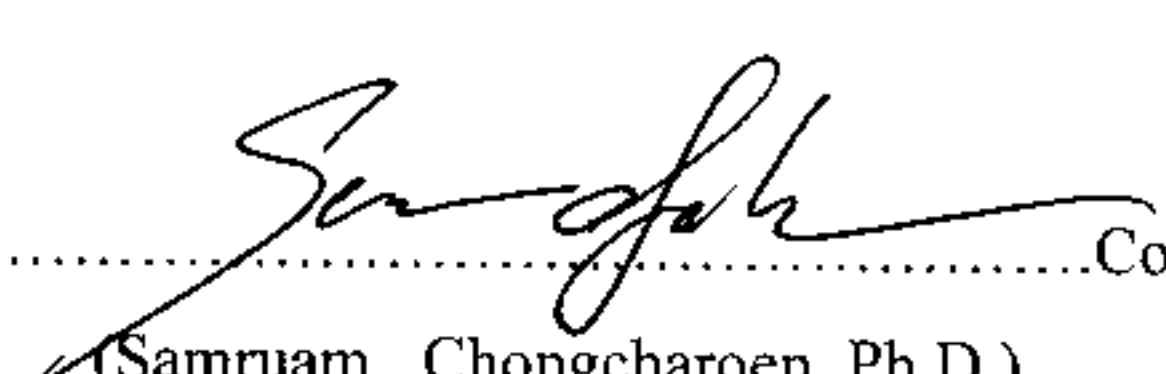
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ABSTRACT

Title of Dissertation	Permutation Test of Partial Regression Coefficients
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In multiple linear regression model, the partial F test is used to perform the significance test of partial regression coefficients when the errors are assumed to be independent identically (i.i.d.) and normally distributed. However, without the normality assumption, the partial F test may not be efficient in terms of the power of the test.

In this dissertation, a nonparametric permutation test, called the Sr Permutation test, is developed. This test can be applied to any distribution of i.i.d. errors. A simulation study shows that, for the case of i.i.d. non-normal errors, the Sr permutation test has type I error that is not significantly different from the significance level α , and high power compared with the existing tests (e.g. the partial F test and some previous work on permutation tests, namely the Manly test and the Ter Braak test). Further, the Sr permutation test and the partial F test have little difference in power in the case of i.i.d. normal errors with large sample sizes ($n = 16, 20$).

Moreover, the asymptotic distribution of the permuted statistic \tilde{F}_{Sr} can also be obtained when the errors are i.i.d. with mean zero and finite fourth moment. Due to the asymptotic distribution of \tilde{F}_{Sr} , an alternative test, called the asymptotic chi-square test, can be used to perform the significance test of partial regression coefficients. By simulation study, the asymptotic chi-square test also has satisfactory results (in terms of type I error and power) in the case of i.i.d. errors, regardless of the distribution, when the sample size is large ($n = 16, 20$). However, the Sr permutation test performs better than the asymptotic chi-square test in all situations.

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Siriwan Tantawanich

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