

# **Variable Selection in Cox Regression Models with Varying Coefficients**

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## **Abstract**

We deal with two kinds of Cox regression models with varying coefficients. The coefficients vary with time in one model. In the other model, there is an important random variable called an index variable and the coefficients vary with the variable. In both models, we have  $p$ -dimensional covariates and  $p$  increases moderately. However, it is the case that only a small part of the covariates are relevant in these situations. We use B-splines and carry out variable selection and estimation of the coefficient functions by using the group SCAD-type estimator and the adaptive group Lasso estimator. We examine the theoretical properties of the estimators, especially the convergence rate, the sparsity, and the oracle property. Simulation studies and a real data analysis show the performance of these new techniques.