The context of this work are performance models of software systems, which are used for predicting performance of a system in its design phase. For this purpose, performance models capture the explicit interactions of software components that make up the system, and the resource demands of primitive actions performed by the components. On contemporary hardware platforms, the software components however interact also through implicit sharing of numerous resources such as processor caches, which influence the performance of the primitive actions. Implicit resource sharing is often omitted in performance models, which affects their prediction accuracy.

In this work we introduce two methods for including resource sharing models in performance models. Next, we propose an approximate resource sharing model based on linear regression, and a detailed model for predicting performance impact of cache sharing. The cache model is validated on a real processor and its design is preceded by extensive experiments which investigate the performance aspects of cache sharing. In addition, we introduce a method for robust validation of performance models using many automatically generated applications.