iSAM2: Incremental Smoothing and Mapping Using the Bayes Tree M. Kaess, H. Johannsson, R. Roberts, V. Ila, J. Leonard, F. Dellaert (IJRR 2012)



- Presents a novel data structure, the Bayes tree, that provides an algorithmic foundation enabling a better understanding of existing graphical model inference algorithms and their connection to sparse matrix factorization methods
- Contributions:
 - Bayes tree encodes a factored probability density, but unlike the clique tree it is directed and maps more naturally to the information matrix of the simultaneous localization and mapping problem
 - Shows how the fairly abstract updates to a matrix factorization translate to a simple editing of the Bayes tree and its conditional densities
 - Applies the Bayes tree to obtain a novel algorithm for sparse nonlinear incremental optimization, which achieves improvements in efficiency through incremental variable re-ordering & relinearization
- Evaluates on a range of real and simulated datasets like Manhattan, Killian Court and City20000