

Title: Extension of Kalman filter

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Abstract: In this thesis we try to explain a theory of the Kalman filter and apply it on European CALL and PUT options. In the first chapter, we summarize a general theory of the Kalman filter for a linear state space and an extension of the Kalman filter for a non-linear state space. In the second chapter, we estimate the state price density from prices of European CALL options and European PUT options. In the third chapter, we mention applications of the previous theory on the real data sets. Chapter 4 concerns smoothing techniques that are used to obtain a better looking (smoother) state price density estimates.

Keywords: Kalman filter, extended Kalman filter, state price density, CALL option, PUT option