On the relation of the SEIK and ETKF filter methods

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During the recent years several ensemble-based Kalman filter
algorithms have been developed and used that have been classified as
ensemble square-root Kalman filters. Parallel to this development, the
SEIK (Singular 'Evolutive' Interpolated Kalman) filter has been
introduced and was applied in several studies. Some publications note
that the SEIK filter is an ensemble Kalman filter or even an ensemble
square-root Kalman filter. We discuss the relation of the
SEIK filter to ensemble square-root filters in more detail. Doing so,
it becomes evident that the SEIK filter is in deed an ensemble-square
root Kalman filter. Furthermore, the SEIK filter can provide an
analysis ensemble that is identical to that obtained with the Ensemble
Transform Kalman Filter (ETKF). These findings unify the separate
developments that have been performed for the ensemble square-root
Kalman filters and the SEIK filter.