Unscented Transform / Kalman Filter error correction on “Weighting Factor”

In the lecture ( although in the tutorials , the matlab code is correct), in 2021\_Week\_9\_EKF\_UKF, 2021\_Week\_10\_UKF, the weighting factor for sigma points are not correct. In the lecture, the sigma points and its weighting factors are

Define sigma points with weighting function

where

**The necessary condition on the weighting factors should be satisfied**

To increase the accuracy there are some modifications for Weighting factors as

here are tuning parameters dependent of random variables characteristics. However, there is no “optimal method” how to select the parameters upto now. Let us simplify the formula as and

if the Random variable is a Gaussian.