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Title: The high-frequency constant-statistics constraint nonuniformity correction algorithm

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Publisher:Springer New York, 233 Springer Street, New York, NY 10013-1578, United States Abstract:In scene-based nonuniformity correction, "ghosting artifacts" and "convergence speed" are hard to be solved simultaneously. According to the central limit theorem, the decreasing of the sample data's standard deviation is beneficial to the precision and speed of parameter statistics. The convergence precision and speed of parameter statistics correspond to "ghosting artifacts" and "convergence speed". So in this study, we develop a new algorithm called the high-frequency Constant-Statistics Constraint (HFCS) algorithm. The core idea of HFCS is to reduce the input observation data's standard deviation. Two ways are used to achieve this reduction. The first way is frequency separation. The input data's low-space-frequency part is discarded, and HFCS only processes the input data's high-space-frequency part. This can effectively reduce the input data's standard deviation. The second way is to create a Dynamic Range Reduction (DRR) region. Only the high-space-frequency value in the DRR region can be used to update the NUC parameters. DRR region's range is much less than the high-space-frequency's, so it further decrease the input data's standard deviation. The processing results show that HFCS can own high convergence speed with very few ghosting artifacts. © 2011 Springer Science+Business Media, LLC.