Ambiguity-fixed GPS L1-phase ranges for epoch-by-epoch attitude determination

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Abstract: The carrier phase is characterized by a small standard deviation, measuring at most one hundredth of the wavelength. Positions derived from the range measurements made with navigation satellites represent the sole parameters of interest to kinematic users. Pseudo-random noise pseudoranges can facilitate the resolution of ambiguities by providing carrier phases with the estimated covariance matrix. By means of rotation and scaling techniques, a diagonal covariance matrix is created, which serves as a spherical threshold.

Meanwhile, the relative body-fixed coordinates of the baselines should be strictly integrated into an adjustment model. A novel algorithm is developed to explain how to achieve diagonal dominance and determinantal identity. Short baselines of 1–2 m or 5–6 m in length were used in the experiments. The L1-carrier datasets were processed on epoch by epoch basis for analysis of the angular precision and accuracy.