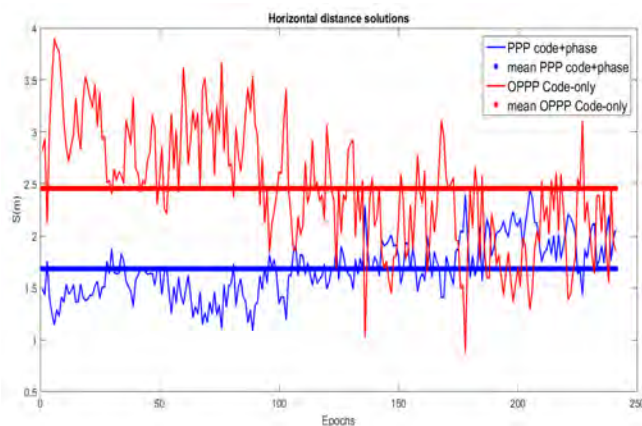




GPS single-frequency combined pseudorange and carrier-phase observables for Precise Point Positioning (PPP) under MatLab environment

Development of an algorithm in MatLab for post-processes GPS single-frequency measurements

The precise point positioning (PPP) is a powerful strategy of GPS using GNSS technology. It is a post-processing method using non-differential observations with single or double frequency in conjunction with IGS precise products. This approach is for static or cinematic positions with high accuracy and all of the physical phenomena (ocean-tide, antenna offsets, carrier-phase wind-up, ionospheric and tropospheric effects, solid earth tides, and so on) disturbing the measurements must be very accurately modeled.



Coordinates solution with OPPP software in horizontal

The GRAPHIC method was introduced by Yunck, uses the average of pseudorange and carrier-phase observable. For this type of technique, the ionospheric effect becomes the dominant source of error when the PPP technique is used, and it takes advantage of cancelling the ionosphere since the ionosphere delays the code measurements and advances the carrier phase measurements .

The focus of this thesis was the absolute geodetic estimation approach for static positions. The observation was performed on April 22th, 2014 from 8:25 UTC to 20:36 UTC on one of the pillars at B-building roof in the *Hochschule Karlsruhe – University of Applied Sciences* in Karlsruhe, Germany, with the receiver Trimble R8 model 3 (GPS L2C and L5 and GLONASS L1/L2 signals) with an antenna model R8 GNSS/SPS88x Internal. During this study the OPPP software gave as a result an improvement in accuracy of ~1m (in most of the cases), against the single frequency code-only measurements. This MatLab algorithm does not fix the ambiguities and since the beginning this was not the objective.



Measurements on the pillar at the B-Building roof in the Hochschule Karlsruhe

With this study, it has been noticed that for single-frequency PPP is highly necessary to fix the ambiguities for better accuracy.