Open Source MATLAB Code for Precise point positioning

User Manual

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main_first_example (static-mate30pro): ..... **Error! Bookmark not defined.**

main_second_example (static-nexus5): ..... **Error! Bookmark not defined.**

main_third_example (dynamic-Xiaomi8): ..... **Error! Bookmark not defined.**

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1. Introduction

In a GNSS receiver, pseduorange and pseudorange rates are extracted from signal tracking to compute the Position, Velocity and Time (PVT) information. Least Square (LS) and Kalman Filter (KF) are the most popular methods employed to compute the PVT information. Inspired by the optimization-based state estimation in the SLAM, optimization method shows prospective potentials in substituting the LS and KF in state estimates. Here, with the aim to improve the GNSS position accuracy and providing an illustrative example on how to implement the optimization method in GNSS, this software implements the optimization method in GNSS position smoothing for convenience of implementing it in other GNSS applications, i.e., signal tracking.

In the software, LS, KF and the optimization methods are implemented to estimate the user receiver position, the pseudo range and pseudorange rates are extracted from smartphones. There are three examples together with the source code are included for describing how to run the software.

2. Requirements

The software is currently implemented and tested in MATLAB 2018 environments on Windows platforms. No specific toolbox is required.

3. Installation

Make sure you have a working MATLAB environment. To install the software just simply unzip the zip files to folder. Fig. 1 presents the folder structure.

(1) Datasets: the folder contains the datasets, including the RINEX, the ephemeris the antenna the DCB and the clock file. (Fig. 2)

(2) main: main functions for the code.

(3) output: the output file.

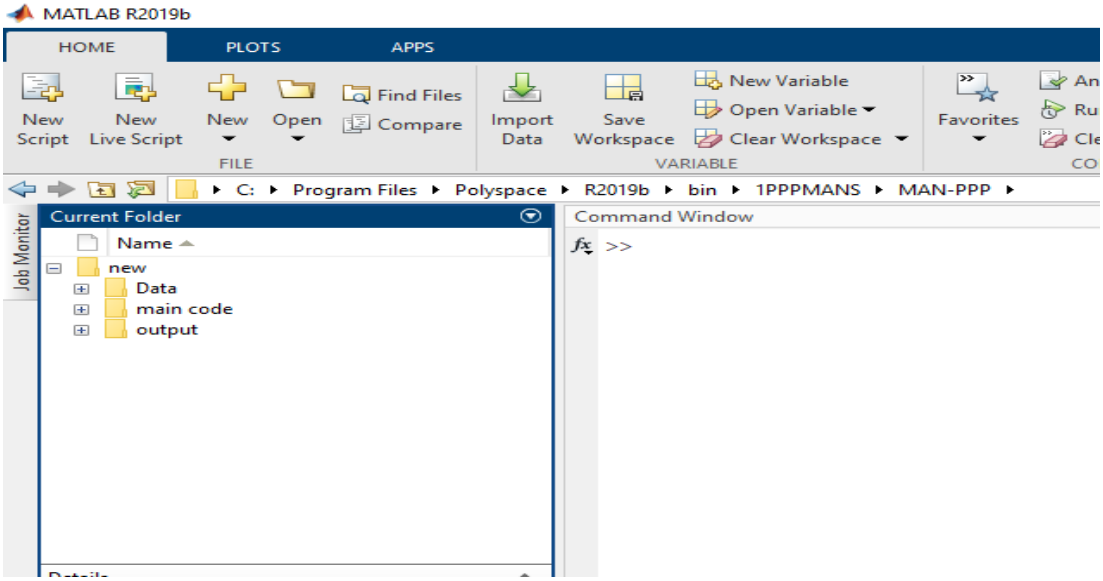

Fig. 1. Folder structure

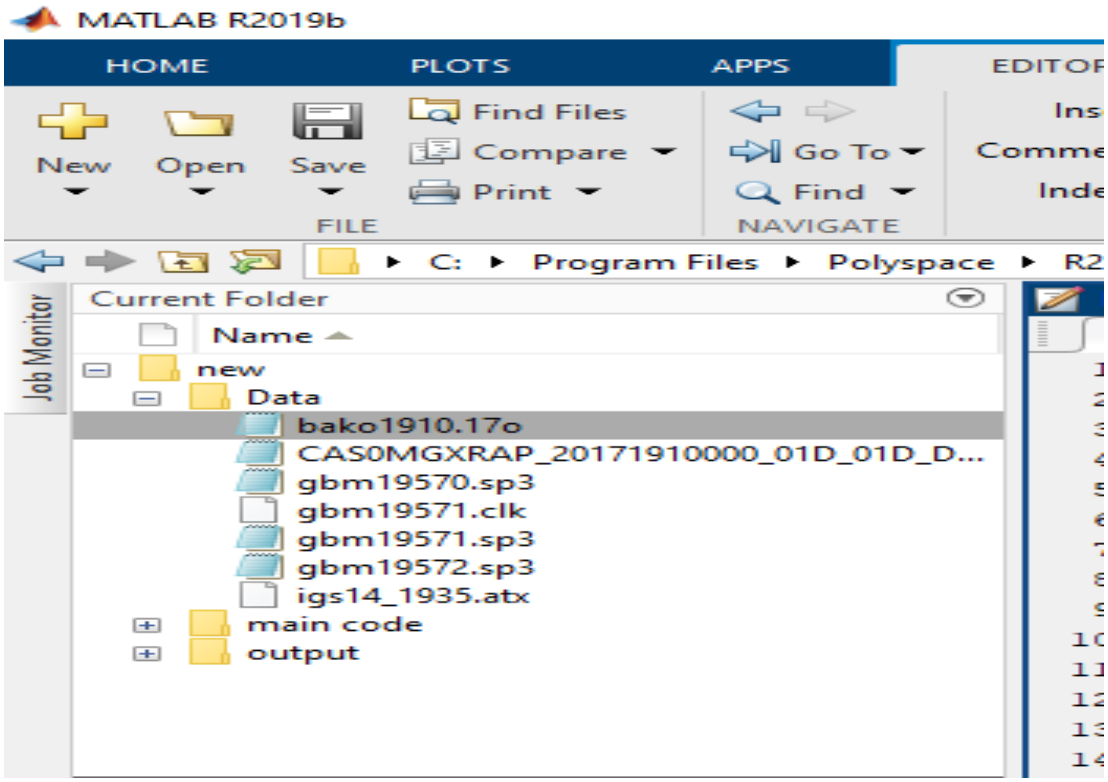

Fig. 2. GNSS Data

Usage and Quick Start

Run the main-code.m in the Fig 3 and Fig 4.

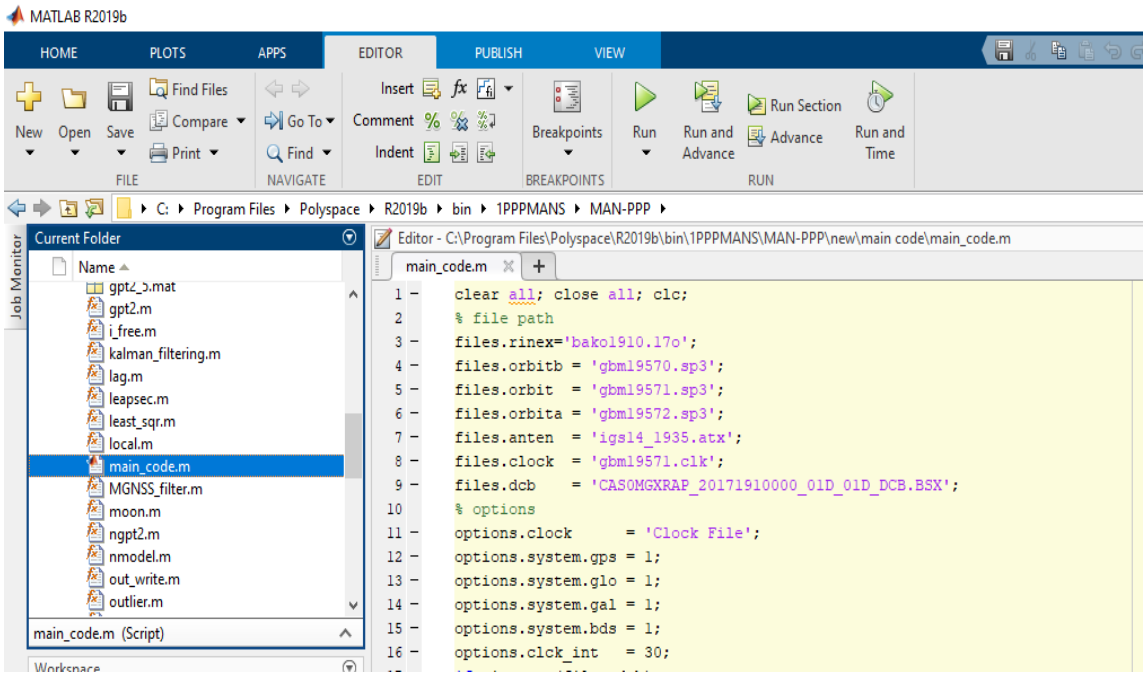

Fig. 3 main code

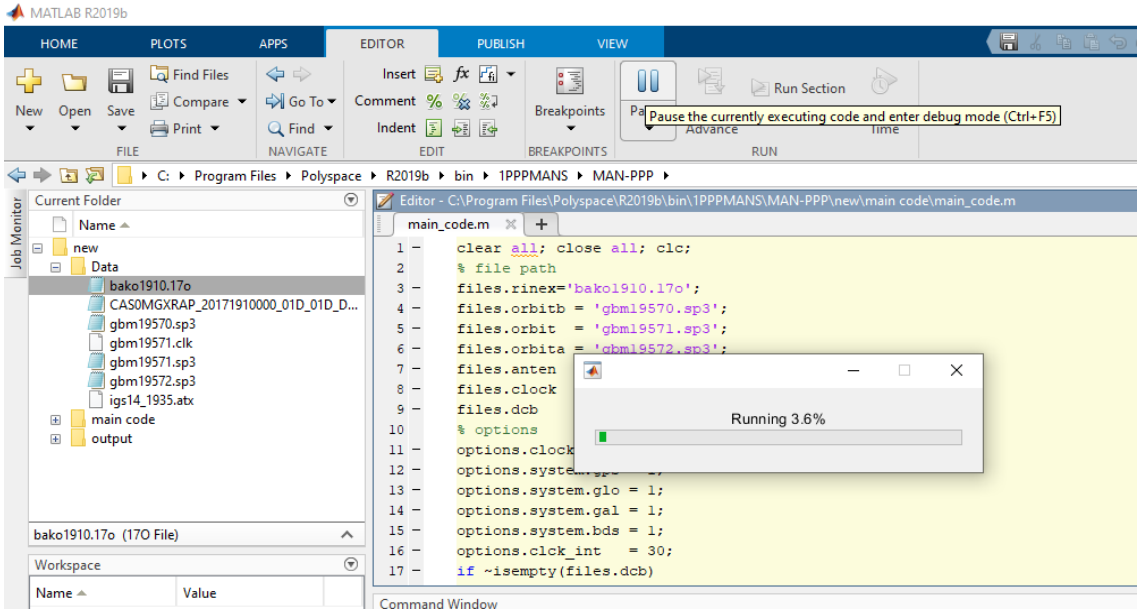

Fig. 4 runing the program.

Output file in the Fig 5.

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Year	DOY	SOD	(X)	(Y)	(Z)	(DT)	(TH)	(TW)	(TT)	(SDR)
2017	191	0	-1836968.401	6065618.784	-716257.635	1.646	2.268	-0.002	2.266	14.925
2017	191	30	-1836968.796	6065618.786	-716257.627	0.801	2.268	0.177	2.444	14.602
2017	191	60	-1836968.433	6065618.069	-716257.806	0.830	2.268	0.189	2.457	14.373
2017	191	90	-1836968.797	6065617.394	-716257.883	0.756	2.268	0.207	2.475	14.254
2017	191	120	-1836968.683	6065617.257	-716257.849	0.560	2.268	0.215	2.483	14.160
2017	191	150	-1836968.653	6065617.009	-716257.906	0.616	2.268	0.253	2.521	14.107
2017	191	180	-1836968.560	6065616.917	-716257.902	0.428	2.268	0.276	2.544	14.061
2017	191	210	-1836968.525	6065616.819	-716257.901	0.809	2.268	0.277	2.545	14.021
2017	191	240	-1836968.346	6065616.887	-716257.922	0.320	2.268	0.264	2.532	13.983
2017	191	270	-1836968.304	6065616.893	-716257.926	0.560	2.268	0.244	2.512	13.953
2017	191	300	-1836968.643	6065617.061	-716257.976	1.178	2.268	0.232	2.499	13.961
2017	191	330	-1836968.875	6065617.219	-716258.022	0.990	2.268	0.215	2.483	13.964
2017	191	360	-1836969.019	6065617.226	-716258.035	0.816	2.268	0.220	2.487	13.964
2017	191	390	-1836969.072	6065617.238	-716258.043	0.802	2.268	0.226	2.493	13.959
2017	191	420	-1836969.162	6065617.194	-716258.039	0.873	2.268	0.237	2.505	13.956
2017	191	450	-1836969.230	6065617.196	-716258.038	0.680	2.268	0.231	2.498	13.951
2017	191	480	-1836969.266	6065617.181	-716258.032	0.799	2.268	0.234	2.501	13.944
2017	191	510	-1836969.288	6065617.186	-716258.026	1.017	2.268	0.231	2.499	13.938
2017	191	540	-1836969.306	6065617.158	-716258.013	0.962	2.268	0.237	2.505	13.934
2017	191	570	-1836969.311	6065617.135	-716258.000	0.858	2.268	0.243	2.510	13.928
2017	191	600	-1836969.348	6065617.087	-716257.989	0.824	2.268	0.252	2.519	13.925
2017	191	630	-1836969.381	6065617.083	-716257.983	1.004	2.268	0.249	2.517	13.922
2017	191	660	-1836969.384	6065617.066	-716257.974	0.661	2.268	0.253	2.520	13.917
2017	191	690	-1836969.396	6065617.053	-716257.974	0.292	2.268	0.257	2.524	13.915
2017	191	720	-1836969.403	6065617.055	-716257.973	0.580	2.268	0.258	2.526	13.911
2017	191	750	-1836969.415	6065617.041	-716257.973	0.697	2.268	0.260	2.528	13.907
2017	191	780	-1836969.418	6065617.044	-716257.972	0.234	2.268	0.259	2.527	13.906
2017	191	810	-1836969.420	6065617.037	-716257.970	0.210	2.268	0.260	2.528	13.905
2017	191	840	-1836969.430	6065617.029	-716257.967	0.293	2.268	0.260	2.528	13.905
2017	191	870	-1836969.432	6065617.016	-716257.961	0.312	2.268	0.262	2.530	13.906
2017	191	900	-1836969.436	6065617.009	-716257.959	0.375	2.268	0.264	2.532	13.905
2017	191	930	-1836969.447	6065616.995	-716257.955	0.547	2.268	0.266	2.534	13.906
2017	191	960	-1836969.450	6065616.980	-716257.951	0.482	2.268	0.268	2.536	13.910
2017	191	990	-1836969.455	6065616.964	-716257.945	0.294	2.268	0.270	2.537	13.914
2017	191	1020	-1836969.444	6065616.955	-716257.945	0.391	2.268	0.269	2.537	13.917

Contact Information

This is the first version of this software. Please do not hesitate to contact us if you come across any bugs or have any comments, suggestions or corrections. We will reply you by e-mail as soon as possible.

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