Function description of IIR filtering

GravLab Team

Contents

IIR

Description:

IIR creates and performs an Nth-order IIR filter in the user's data. (The user chooses the Nth order).

Syntax:

[Vij_IIR,~,N2,b2,a2] = IIR(z,currentFolder);

Input variables:

Variable name	Size	Description
z	6x1	The reduced Vij data.
currentFolder	-	The IIR working folder.

Output variables:

Variable name	Size	Description
Vij_IIR.mat	10x1	Contains the latitude and the longitude in degrees, the altitude in meters, the UTC, and the reduced filtered gravity gradients in the GRF.
Vij_IIR_Report.txt	-	Report regarding to the file format.
N2	n	N-coefficients/ the order of IIR filter
b2	n	the transfer function coefficients of an Nth-order lowpass digital Butterworth filter
a2	n	the transfer function coefficients of an Nth-order lowpass digital Butterworth filter

plot_filtered__sgg_grf_iir

Description:

plot_filtered__sgg_grf_iir creates plots of the reduced filtered data in GRF in the time domain (showing how the signal changes with time).

Syntax:

[~] = plot_filtered__sgg_grf_iir(Vij_IIR,z,N2,currentFolder);

Input variables:

Variable name	Size	Description
Vij_IIR	6x1	Contains the reduced filtered gravity gradients in the GRF.
z	6x1	The data before the filtering
N2	n	N-coefficients/ the order of IIR filter.
currentFolder	-	The IIR working folder.

Output variables:

Figure name	Size	Description
Filtered_IIR_Vij_GRF_date.jpeg	-	A figure in .jpeg format is saved in the IIR/ IIR Filtered Vij GRF folder.
Filtered_IIR_Vij_GRF_date.fig	-	A figure in .fig format is saved in the IIR/ IIR Filtered Vij GRF folder.

IIR_PSD_plots

Description:

IIR_PSD_plots creates figures with the Power Spectral Densities (PSDs) of the filtered and the unfiltered reduced GOCE signal. (unit in figures: Eötvös/sqrt(HZ)).

Syntax:

[k] = IIR_PSD_plots(z, Vij_IIR,N2,currentFolder);

Input variables:

Variable name	Size	Description
z	6x1	The data before the filtering
Vij_FIR	6x1	Contains the reduced filtered gravity gradients in the GRF.
N2	n	N-coefficients/ the order of IIR filter.
currentFolder	-	The IIR working folder.

Output variables:

Figure name	Size	Description
PSD_GG_GRF_IIR_N_date.jpeg	-	A figure in .jpeg format is saved in the IIR/ PSD IIR filtered Vij GRF folder.
PSD_GG_GRF_IIR_N_date.jpeg.fig	-	A figure in .fig format is saved in the IIR/ PSD IIR filtered Vij GRF folder.

stats_filtered_IIR_SGG_GRF

Description:
stats_filtered_IIR_SGG_GRF computes the statistics (min, max, mean, std, rms) of the filtered - reduced data.

Syntax:
[~] = stats_filtered_IIR_SGG_GRF(Vij_filtered,currentFolder);

Input variables:

Variable name	Size	Description
Vij_filtered	6x1	Contains the reduced filtered gravity gradients in the GRF.
currentFolder	-	The IIR working folder.

Output variables:

Variable name	Size	Description
stats_filtered_Vij_GRF.mat	nx6	Statistics of the filtered Vij in GRF.
stats_filtered_Vij_GRF_Report.txt	-	Report regarding to the file format.