

Seismic data analysis



Link

<https://github.com/ITConstructor/SeismicDataAnalysis>

Main purpose

This project is created to find correlation between spectrum acceleration of seismic impact and height of building.

Description

Created solution works with COSMOS files of .v2 and .v3 extensions. Files contains data of sensors, building and seismic impact, saved as array of acceleration, velocity and displacement values. Tasks which solution is able to do are:

1. Open and parse COSMOS files, to make it human-readable;

MainWindow

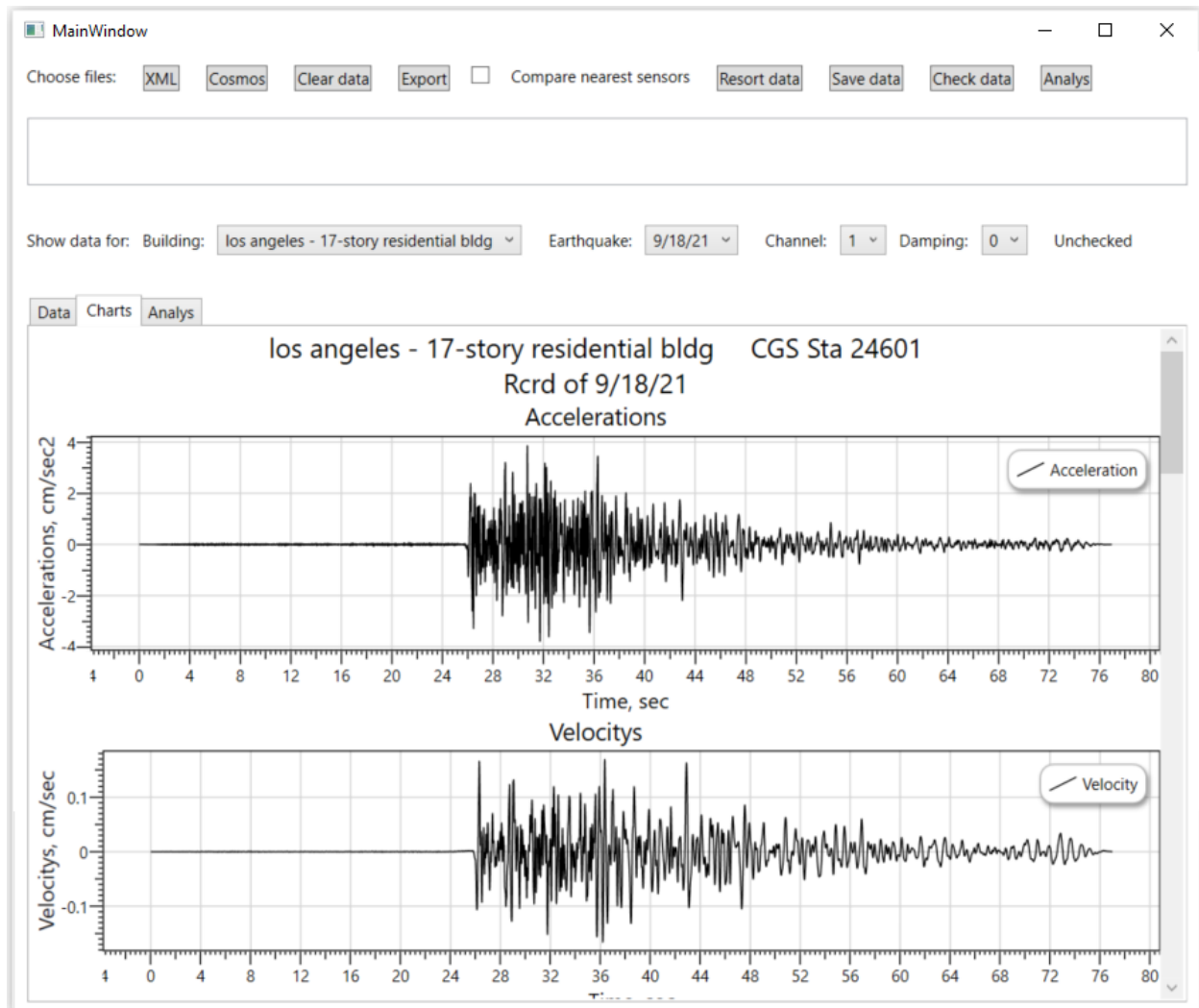
Choose files: XML Cosmos Clear data Export ☐ Compare nearest sensors Resort data Save data Check data Analys

Show data for: Building: los angeles - 17-story residential bldg Earthquake: 9/18/21 Channel: 1 Damping: 0 Unchecked

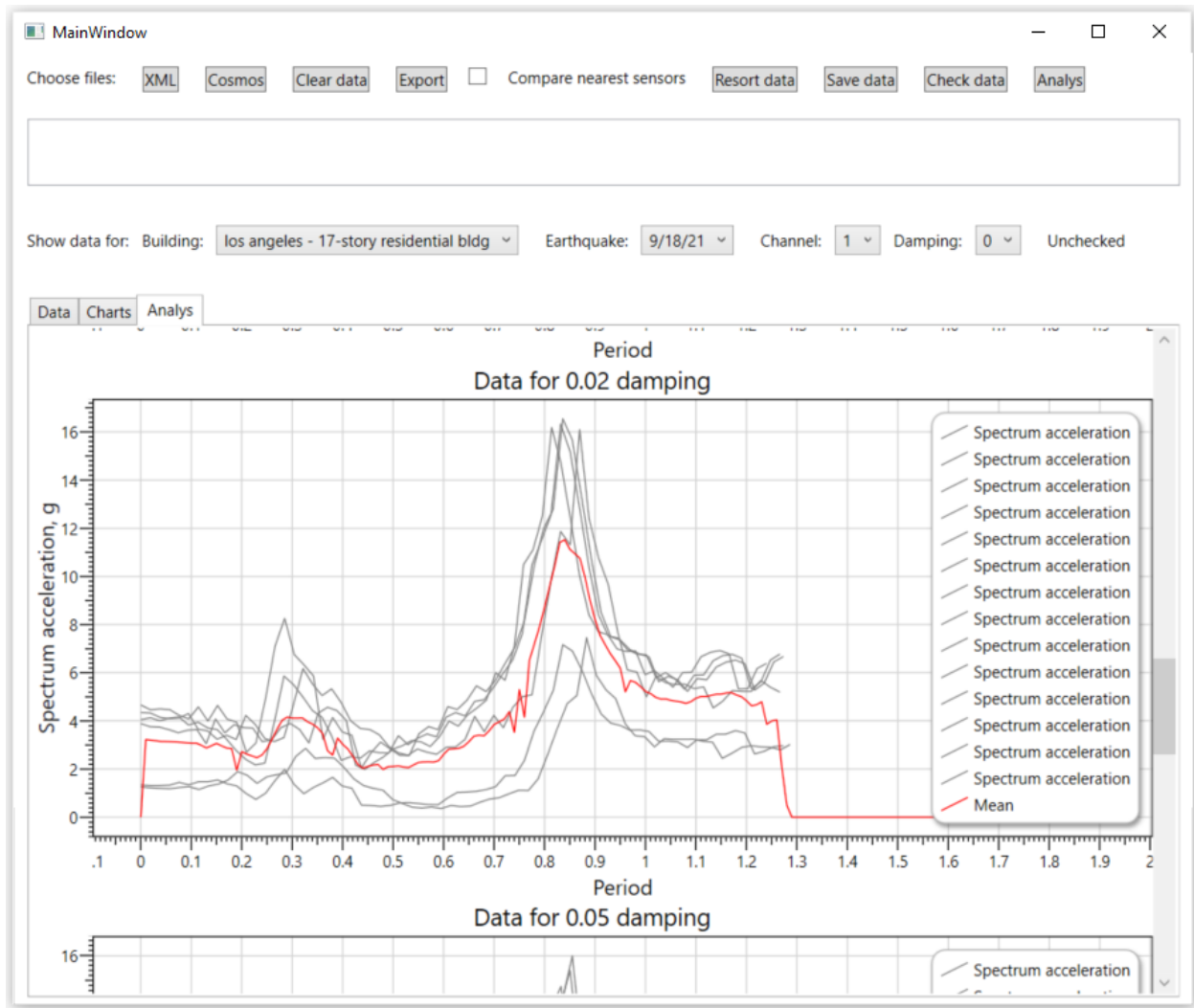
Data Charts Analys

BuildingName: los angeles - 17-story residential bldg
 Location: 1st floor: ne wall, e end
 LocationHeight: 0
 LocationX: 69.6976
 LocationY: 4.7244
 BuildingLength: 69.088
 BuildingWidth: 24.3078
 StructuralReference: 40
 Earthquake magnitude:
 Hypocenter depth:
 Site geology:
 Vs30: 0
 Building material:
 FileName:
 PhysicalParameter:
 NumberOfAccelerationsPoints: 7700
 NumberOfVelocitysPoints: 7700
 NumberOfDisplacementsPoints: 7700
 SpaceOfRecord: 0.01
 StationNumber: 24601
 ChannelNumber: 1
 WeekDay:
 Month: 9
 Day: 18
 Year: 21
 Hour: 0
 Minute: 0
 Second: 0
 FullDate:

2. Draw charts of acceleration, velocity, displacement and spectrum acceleration with different damping;



3. Calculate mean of spectrum acceleration of each building and correlation coefficient between spectrum acceleration of seismic impact and height of building. Results presented as charts.





Results

Through the experiments, I've determined, that the correlation coefficient is between 4-8. Data has linear correlation, but it seems very weak.

Solution stack

Environment - Microsoft Visual Studio 2022

Languages and frameworks: C#, WPF, Dynamic data display