Elastodynamics Tutorials - Parallel 2D elastodynimic simulations with PSD

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Abstract

This document details some tutorials of elastodynamics module of PSD. These tutorials are not verbose, but does instead give a kick start to users/developers for using PSD's elastodynamics module.

The problem of interest is a single Dirichlet condition (clamped end bar) and traction loading. For this example we use Newmark-β time discretization. Additionally postrocessing is demanded for displacement, acceleration, and velocity (u, a, v).

```
PSD_PreProcess -dimension 2 -problem elastodynamics -dirichletconditions 1 -tractionconditions 1 \
-timediscretization newmark_beta -postprocess uav
```

Once the step above has been performed, we solve the problem using two MPI processes, with the given mesh file bar-dynamic.msh.

```
PSD_Solve -np 2 Main.edp -mesh ./../Meshes/2D/bar-dynamic.msh -v 0
```

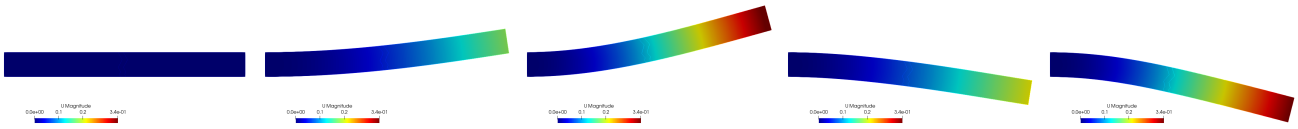

Figure 1: Finite element displacement field on warped mesh shown at different time steps.

Using ParaView for postprocessing the results that are provided in the VTUs... folder, results such as those shown in figure~1 can be extracted.