ElastoMonolith: A Monolithic Optimization-based Liquid Solver for Contact-Aware Elastic-Solid Coupling – Supplementary Material

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1 ADDITIONAL RESULTS

1.1 Two-Way Fluid-Solid Coupling with Stiffer Materials

To evaluate the performance difference for stiffer elastic solids within a two-way fluid-solid coupling scenario, we experimented with an elastic beam (2.2k vertices and 9.0k elements, Poisson's ratio $\nu = 0.49$, and density 200 kg/m^3) in a dambreak scenario with fluid density of $1,000$ kg/m^3, grid resolution of 80^3, and 967.7k particles, as shown in Figure 1. Figure 2 compares profiles of computational costs and Table 1 summarizes the simulation settings and averaged results over 200 frames. Since stiffer materials make it more difficult for MPRGP to converge, the number of required iterations increased and thus the computational cost as well.

(a) 1.0×10^4 (Pa) (b) 1.0×10^5 (Pa) (c) 1.0×10^6 (Pa)

Fig. 1. An elastic beam (with its top fixed) deformed in a dam break scenario, simulated with different material stiffnesses.

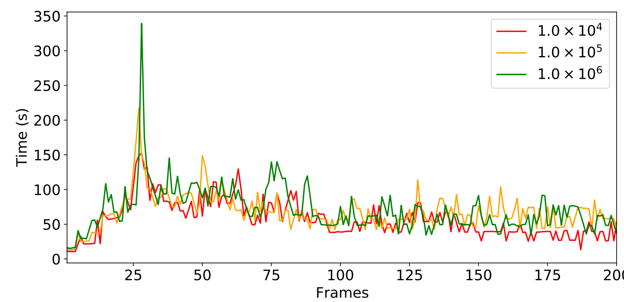

Fig. 2. Profiles of the total time for the entire pressure-elasticity handling phase per frame for Figure 1.

Table 1. Simulation settings and results for Figure 1. The system size is denoted by n, and the number of non-zeros by z. The averaged MPRGP iteration counts per frame are denoted by M_{iter}. The total time (s) per frame is denoted by T.

Stiffness	n	z	M_{iter}	T
1.0×10^4	178.6k	8.7M	599.0	58.0
1.0×10^5	178.6k	8.8M	658.6	67.9
1.0×10^6	182.9k	8.9M	772.3	71.3

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