Pollution-Free Energy Production by a Proper Misuse of Finite Element Analysis

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John Horgan: The End of Science
Addisson Wesley, 1996

- Have all big questions been answered?
- Could scientists formulate a theory of everything?
- Could they completely explain mystery of universe, matter, mind, etc. ?
- Is absolute truth attainable?
- Etc …

John Horgan: The End of Science
with chapters

- The End of Philosophy
- The End of Physics
- The End of Cosmology
- The End of Machine Science
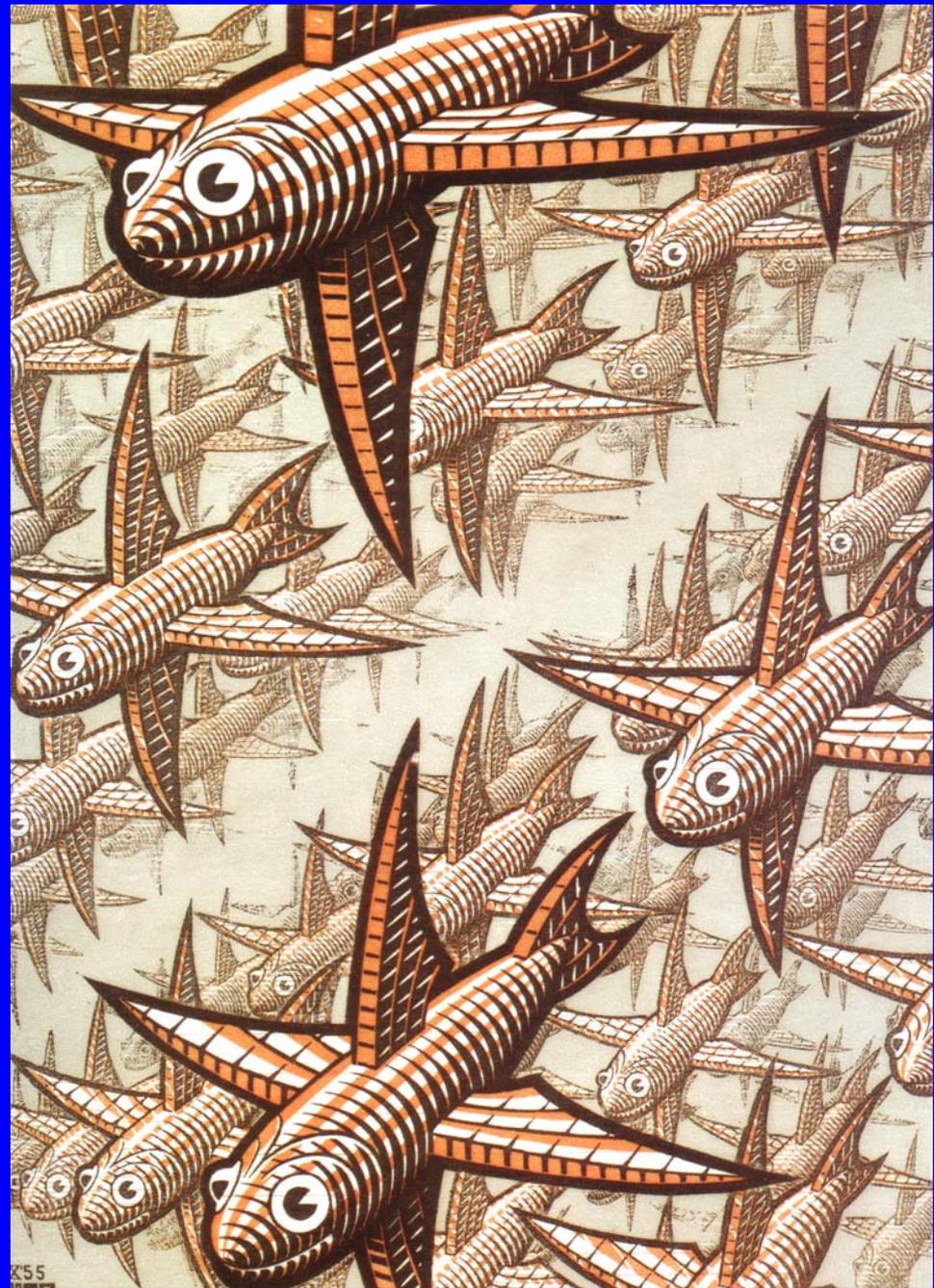- …
- The Terror of God

What are we contributing to?

- No fundamental laws and principles since Newton's time

- Newtonian physics – low velocities

- Continuum mechanics – no quantum microcosms

- Rather more sophisticated models, that either work or do not …

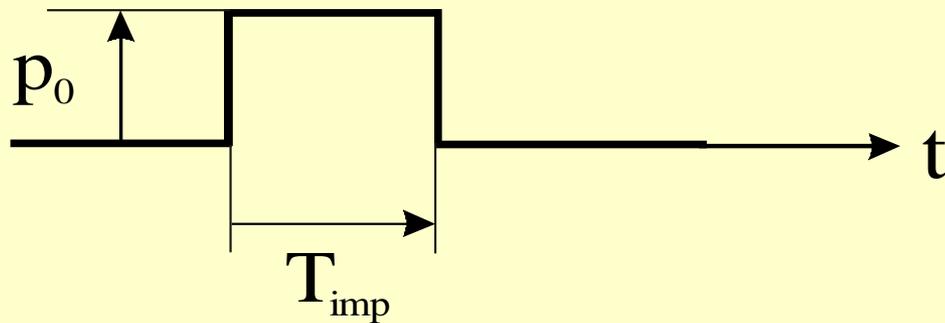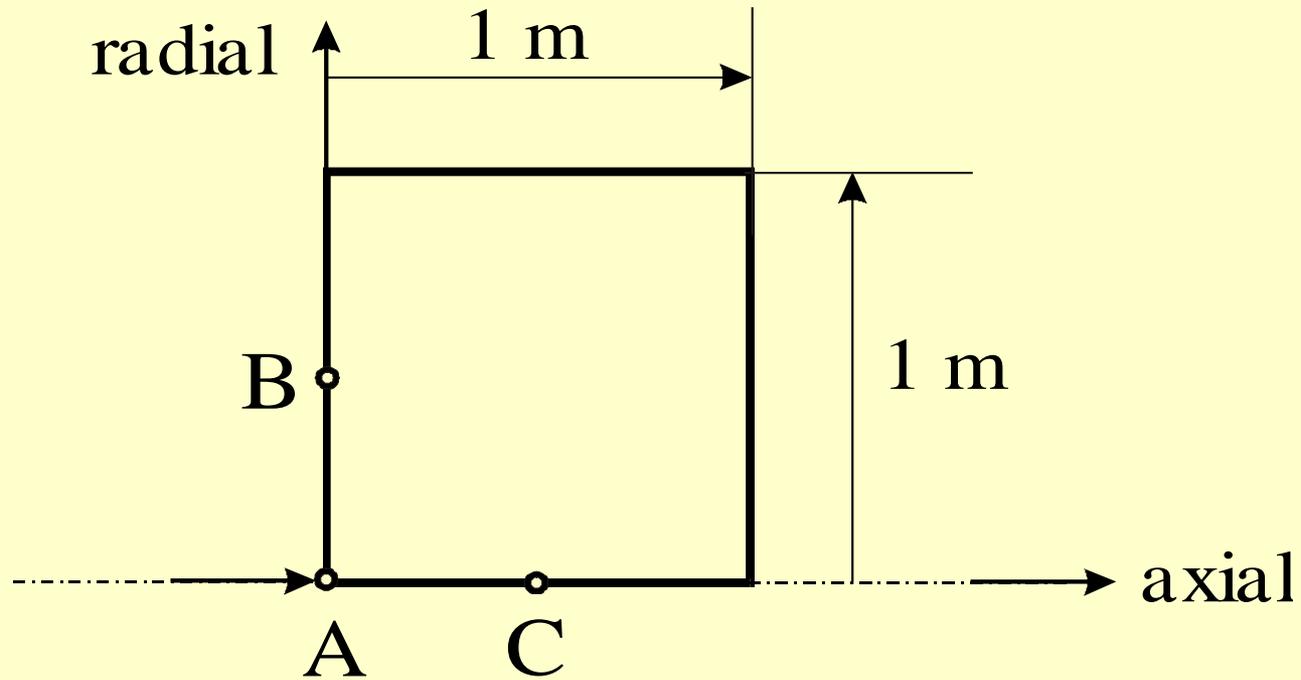- The question of truth is irrelevant … only 'proved' by experiment
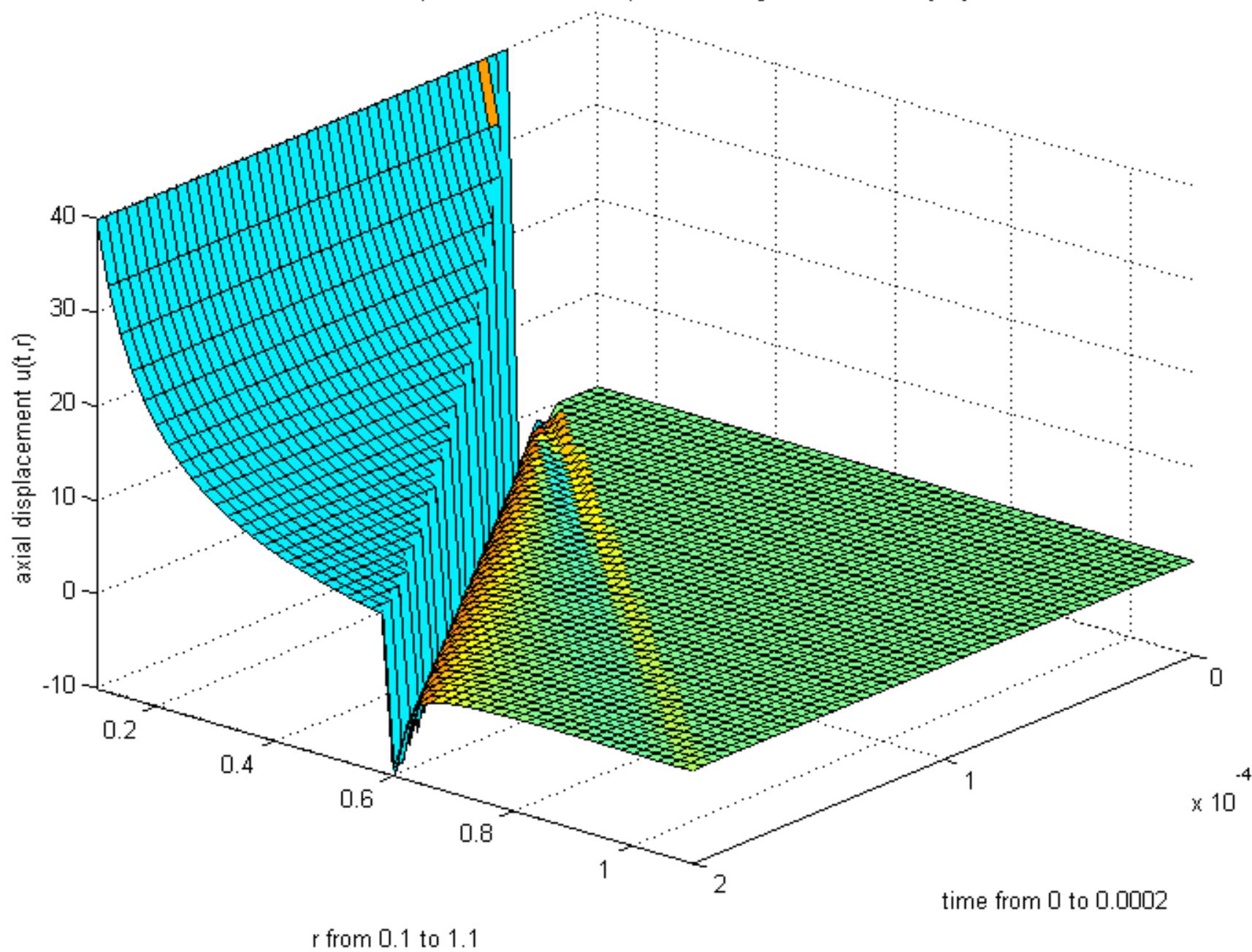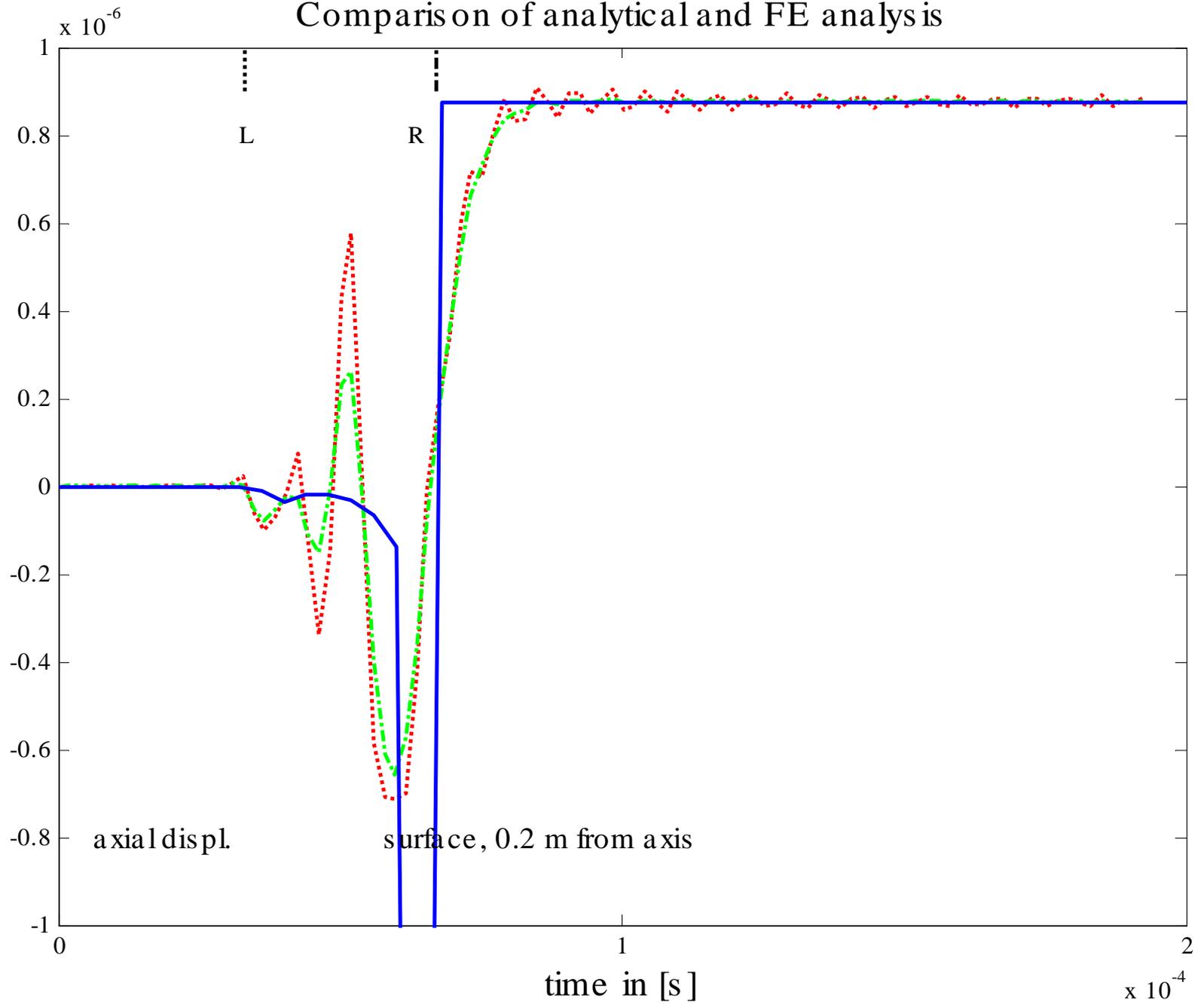
C.M. Esher

discretization
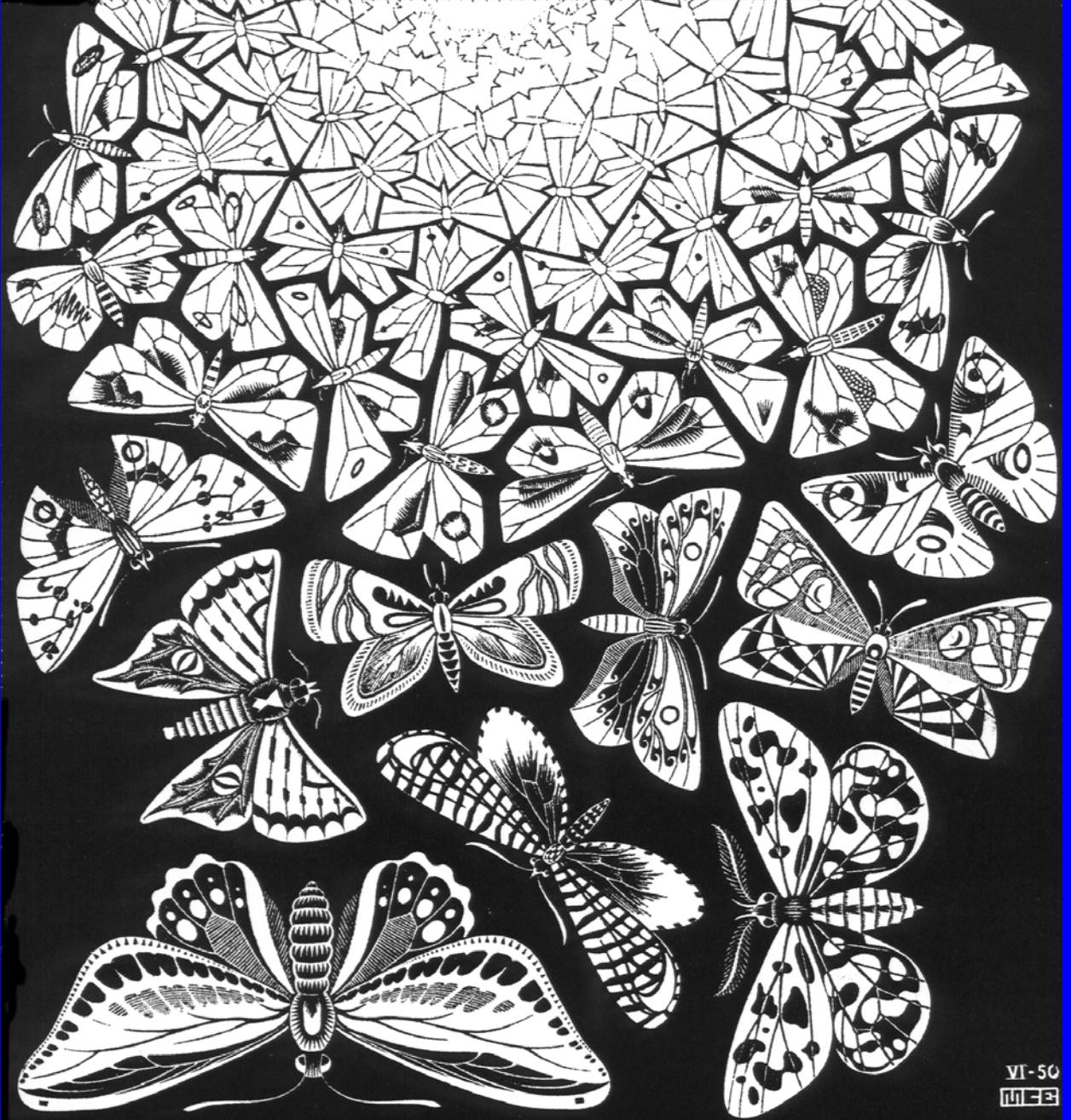
C.M. Esher parallelization

Classical Lamb's problem
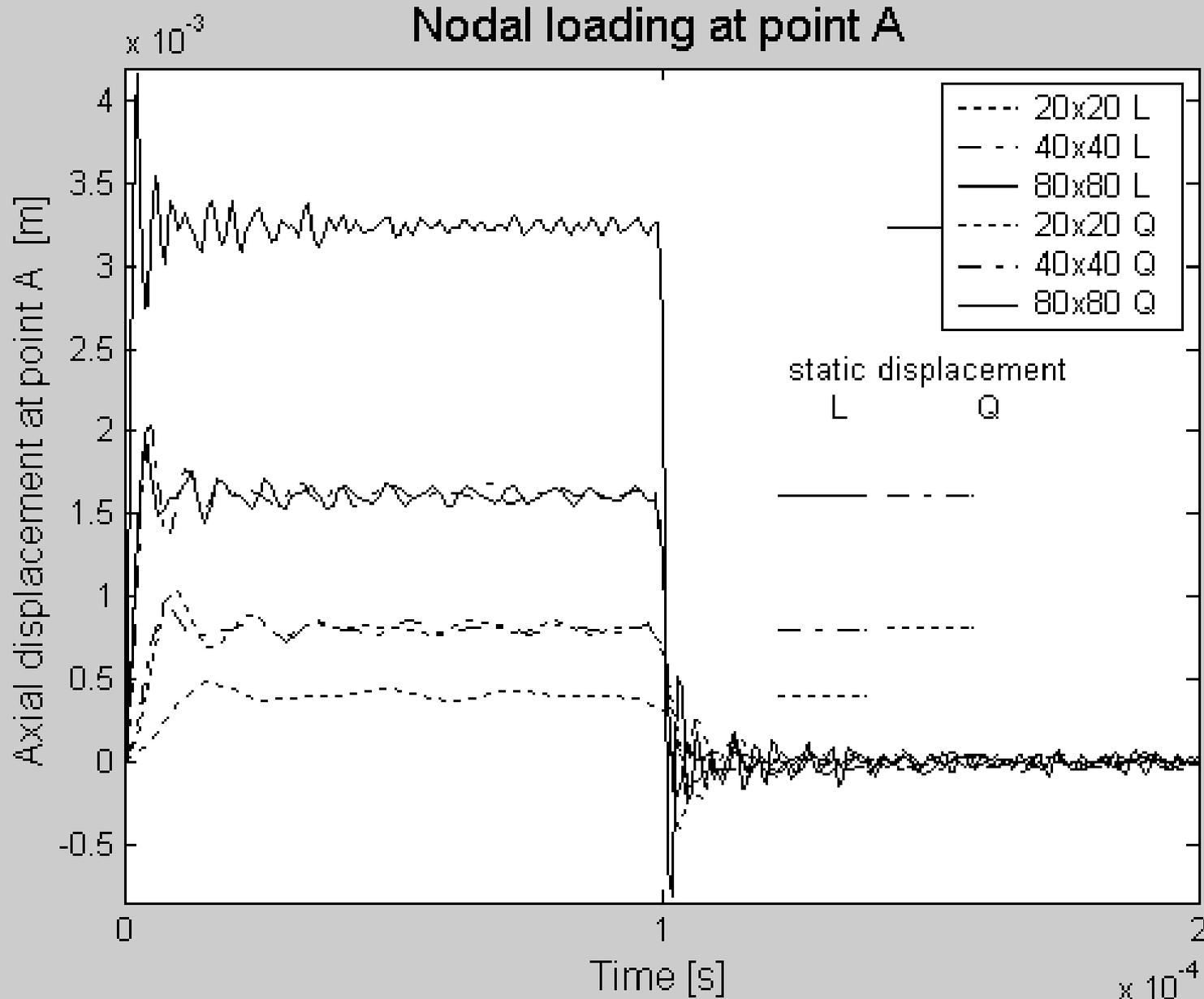
Lamb 3D problem, Heaviside pulse loading, After Pekeris [34]

Comparison of analytical and FE analysis
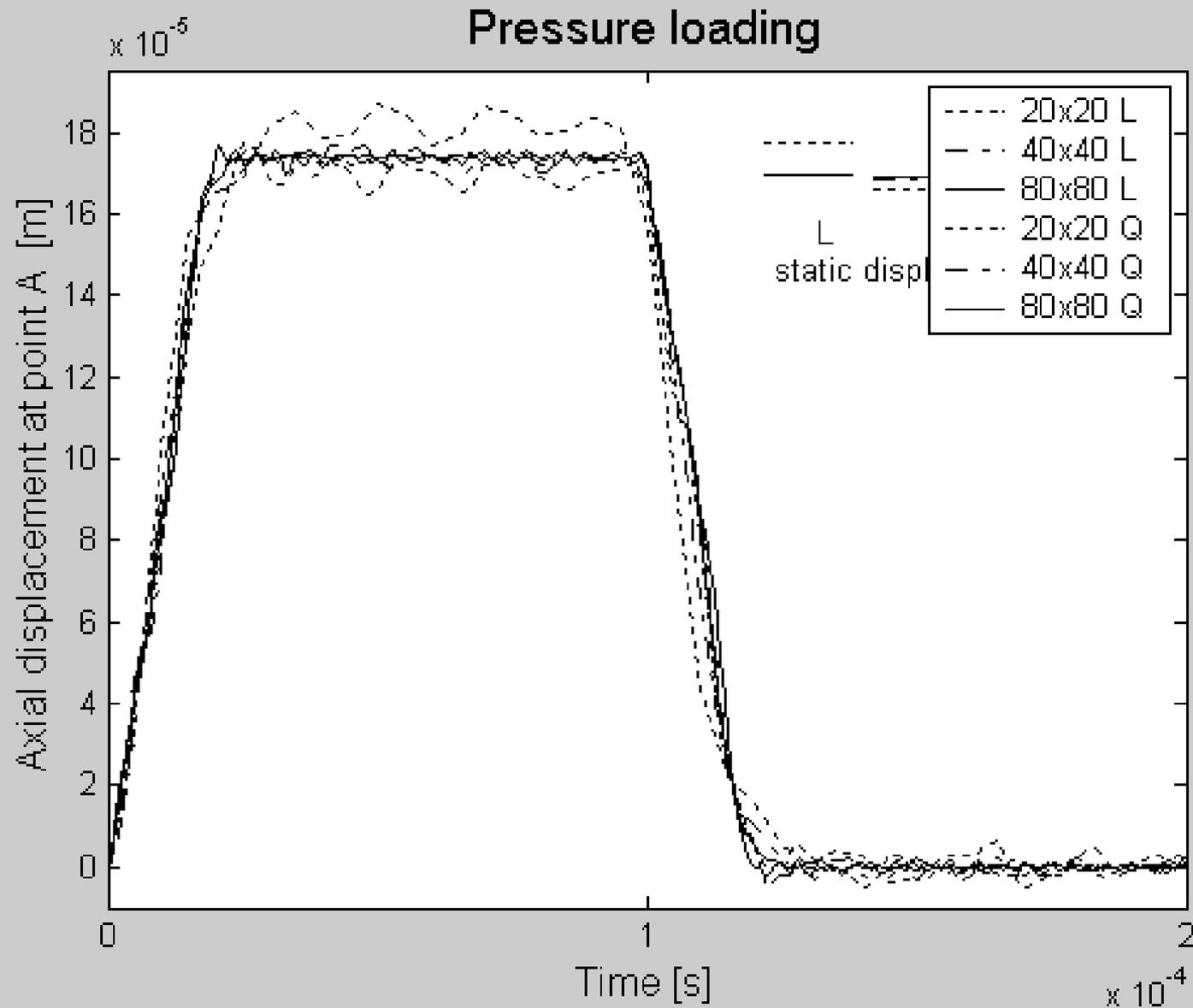
axial displ.   surface, 0.2 m from axis

time in [s]

Axial displacement for a point force loading

Nodal loading at point A

Axial displacement for pressure loading

Plate, axial displacements under loading

Point and pressure loading, rectangular pulse, three meshes

40 x 1000

static solution

20 x 500

static solution

10 x 250

transient solution (pressure) all three cases

static solution

static solution (pressure)

Time [s]

x 10⁻⁵
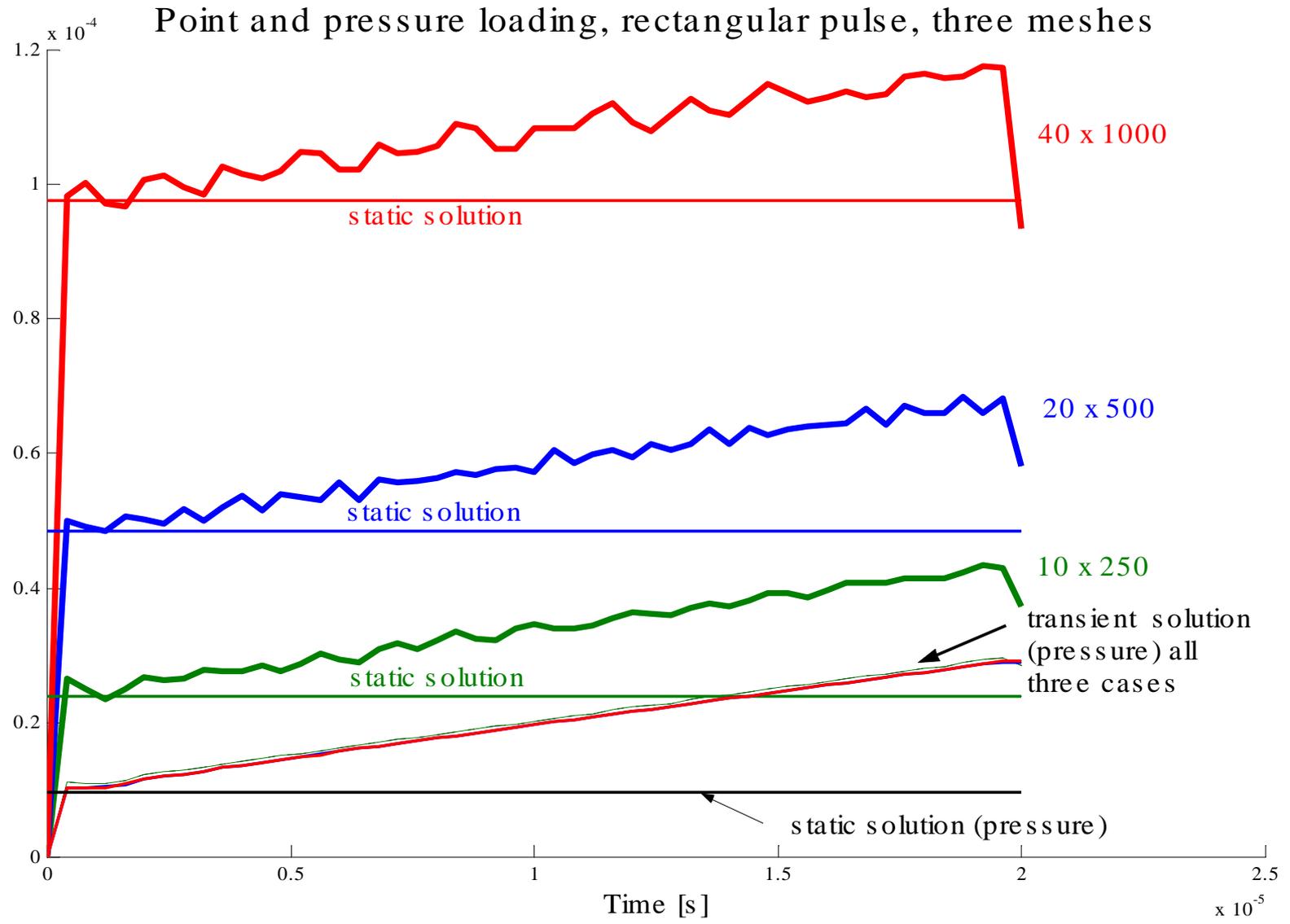
Modelling depends on the number of CPU's

Engine-bottom acceleration for MPP runs using 4/6/8-CPU
(Using Accelerometer Option)

Time (second)
(SAE 60Hz filter used)
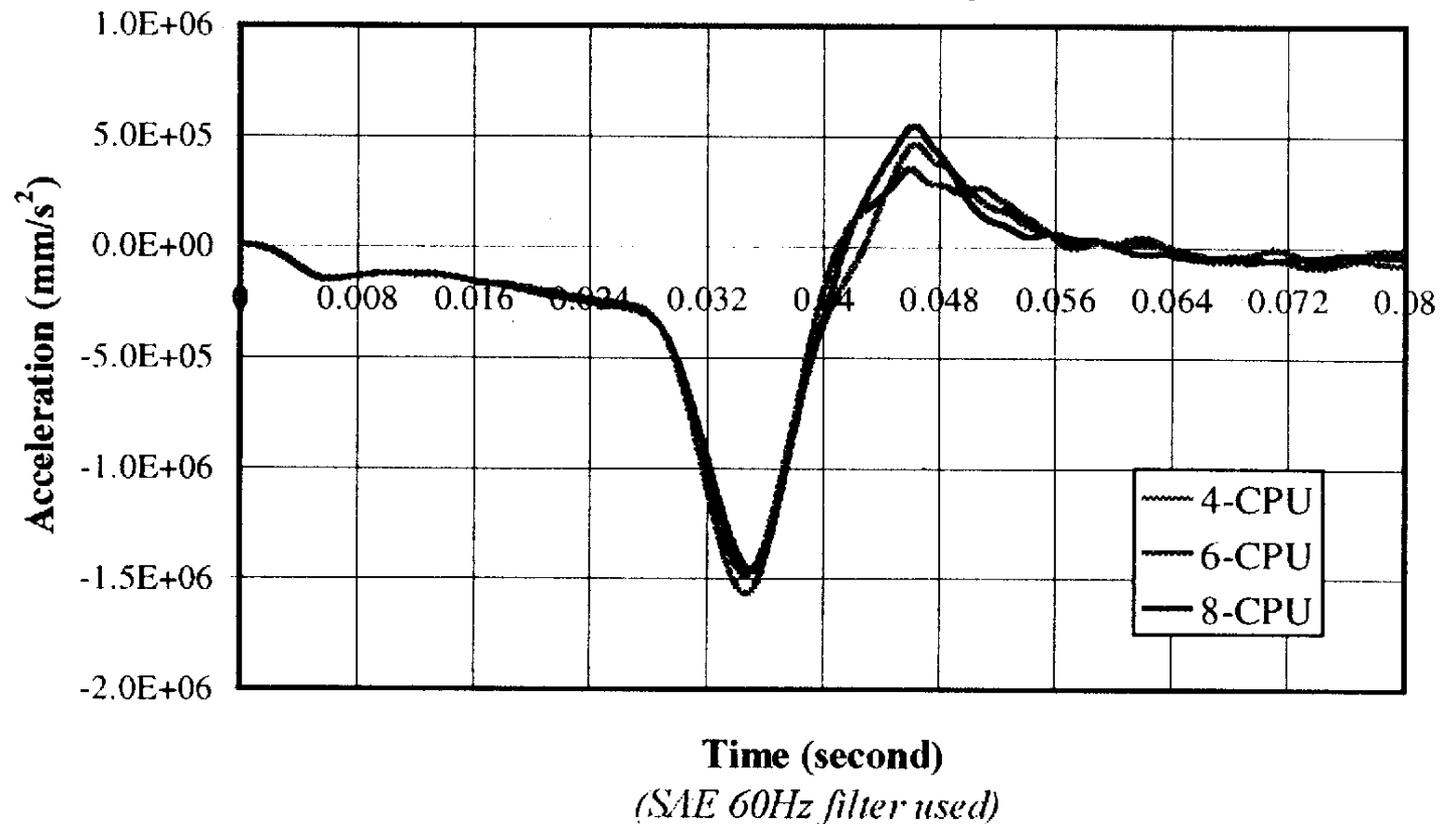
How to avoid false perspectives?

- There are
  - Solid theoretical foundations
  - Efficient hardware
  - Quickly developing parallel and vector sw
- Goals
  - Ascertaining validity limits of models … material data are needed
  - Design of robust solvers running on parallel platforms

Doubtful results and figures

- Could be a source of mental joy, pleasure and inspiration
- The future of finite element analysis does not seem to be as bleak as suggested by John Horgan
- The useless up and down motion which actually could be down and up one should be avoided

C.M. Esher_Ascending and descending