The Things We Does Know

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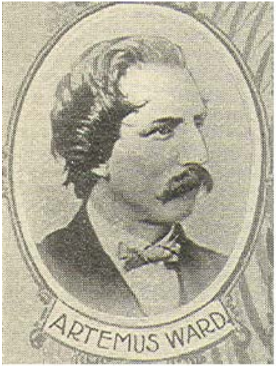
Artemus Ward (1834-1867) wrote that



“It ain’t the things you dont know in life as gets you into trouble; it’s the things you does know as ain’t actually so.”

Evolution of CFD

In 1974, when I first got involved in CFD, the most advaced method avaliable to industry was a second-order finite-volume method.

In 2012, the most advanced method available to industry is ....

- A second-order finite volume method
- Of course, there have been many advances
  - Unstructured and/or adaptive grids
  - Physically-motivated flux functions
  - (Fairly) fast implicit/multigrid solvers

And along the way, there have been significant mutations, like the move to semi-discrete methods

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Path-dependent evolution

There is nothing unique about evolutionary design.

At best it yields a local optimum.

The local optimum that you end up in will depend on the path you took to get there; if you have fishlike ancestors you will have fishlike features.

The skeletons of current CFD codes reveal their evolutionary trajectory.

Four things we does know

- The Euler equations can be closed by assuming an equilibrium equation of state (Zaide)
- The Navier Stokes equations are a parabolic system (Nishikawa)
- Residuals must be eliminated (Caraeni)
- A flux flows through a surface (Roe)

The purpose of these talks is to to question some of our cherished assumptions, in preparation for the revolution. They are NOT intended to present a unified vision of CFD or anything else. That comes on Friday ;-)