Synthesis of the Results for C1.1

R. Abgrall

Team Bacchus
INRIA Bordeaux Sud Ouest and Université de Bordeaux Talence, France

Thanks and warning

- Thanks to the person in charge of the presentation !

Thanks and warning

- Thanks to the person in charge of the presentation !
- All mistakes are mine (R. Abgrall)

Thanks and warning

- Thanks to the person in charge of the presentation !
- All mistakes are mine (R. Abgrall)
- Results not always in the same format: I had to do lots of hand maniputations.

Thanks and warning

- Thanks to the person in charge of the presentation !
- All mistakes are mine (R. Abgrall)
- Results not always in the same format: I had to do lots of hand maniputations.

I am ready to any modification

Participants and numerical methods

. . . results given on gmail.com. . .

missing data Tu et al.

Who	Method	degree	Mesh
Gerald et al.	DG	0-4	Tri
Yano et al.	IsoP DG Roe	1-3	Tri
Abgrall et al.	IsoP RDLxF	2	Tri
Fidkowski	IsoP DG	0-5	Triangles
Galbraith et al.	implicit DG spectral	0-4	Quad
Huynh	explicit DG (CPR)	2-3	Quad/Tri
Kopriva et al.	IsoP explicit/DG	5 (h-p)	Quad
Ollivier-Gooch	FVRoe Cell centered/cell vertex	1-3	Quad/Tri
van der Weide et al.	High order FD	order 2-5	Quad
Trontin	IsoG FEM	2-3	Quad/NURBS
Tu et al.	?	?	?
L. Wang et al.	IsoPDG HLLC	2-3	Tri
ZJ Wang et al.	DG (CPR)	1-5	Tri

Color code

- Item: Meshes given for the workshop; IsoP: Isoparametric, IsoG: Isogeometric
- Item: Implicit.

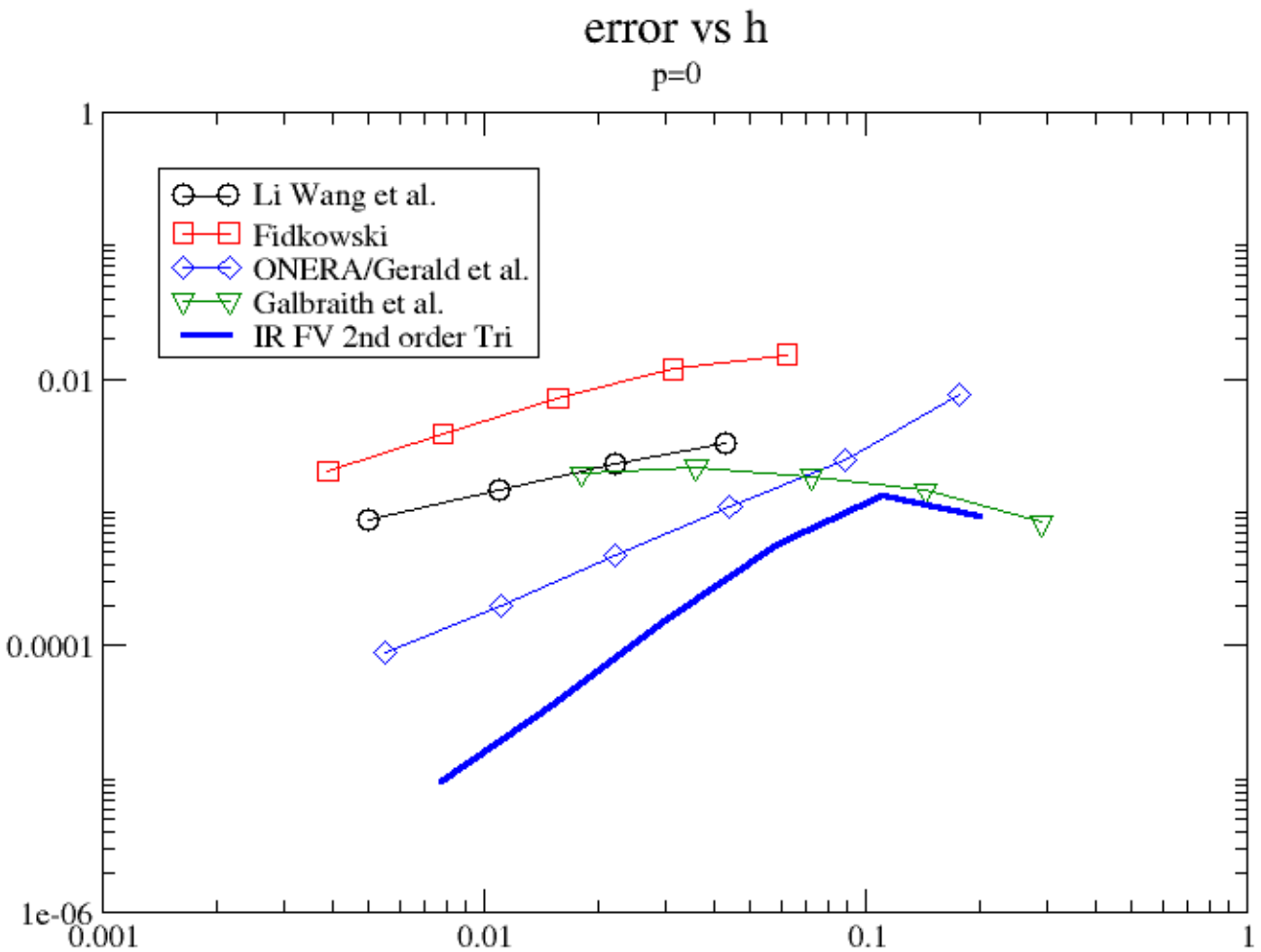
Error

Definition

- $\sqrt{\dfrac{\int_\Omega \left(\dfrac{s - s_\infty}{s_\infty}\right)^2 dx}{|\Omega|^2}}$, $s = p\rho^{-\gamma}$
- Evaluated consistantly with the numerical method and the solution description

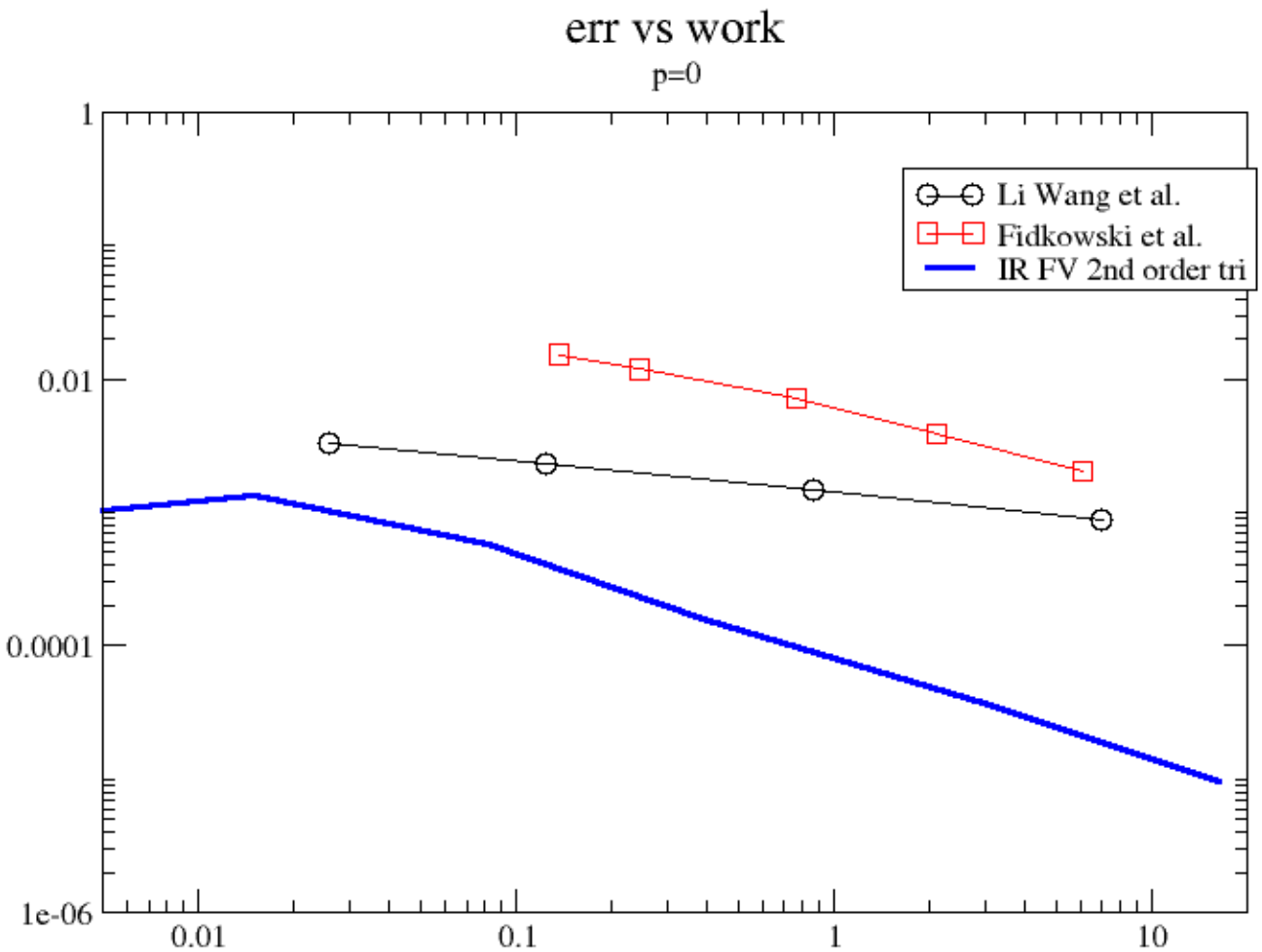
Error/work/participants

p=0



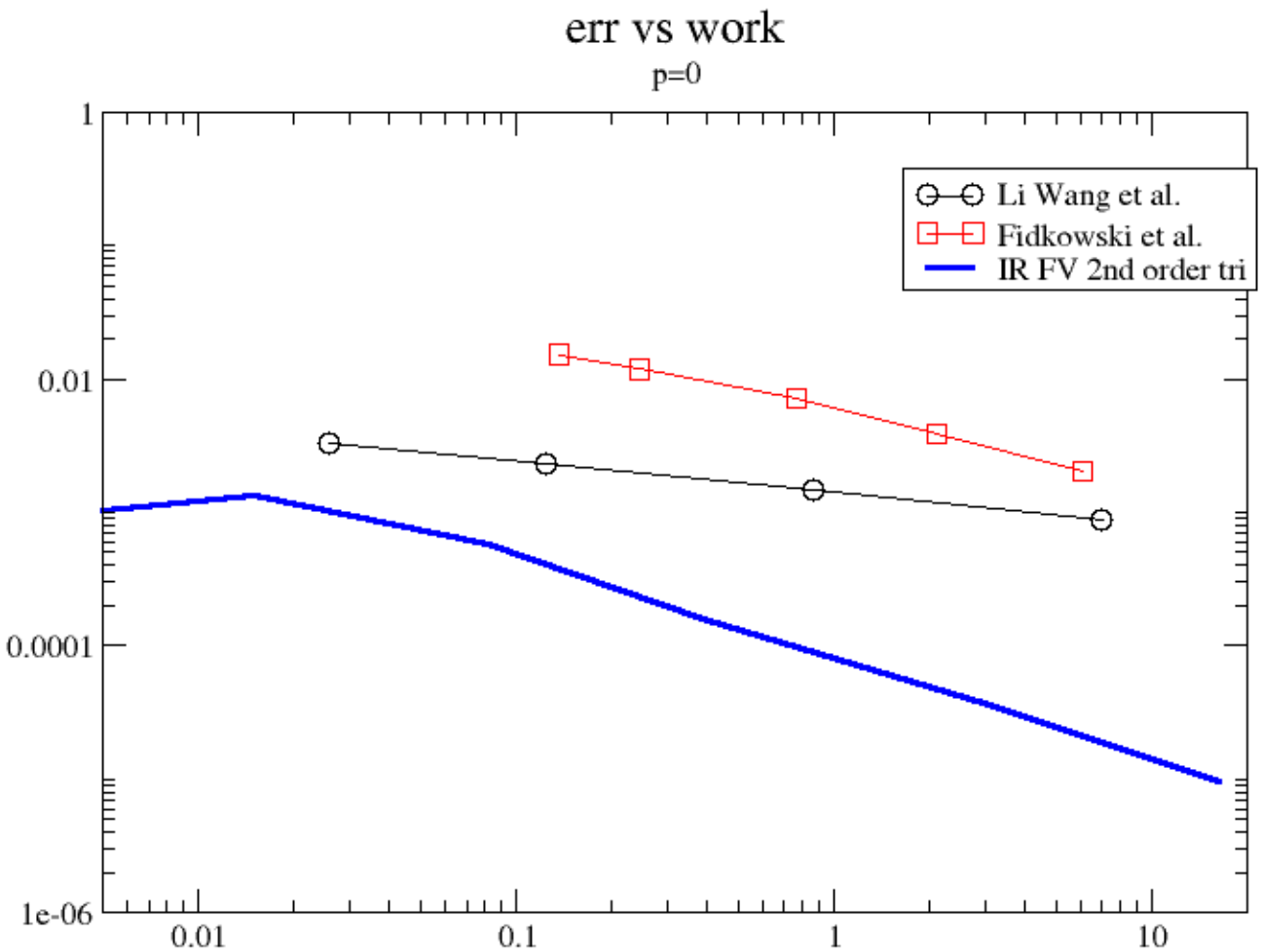
Error/work/participants

p=0



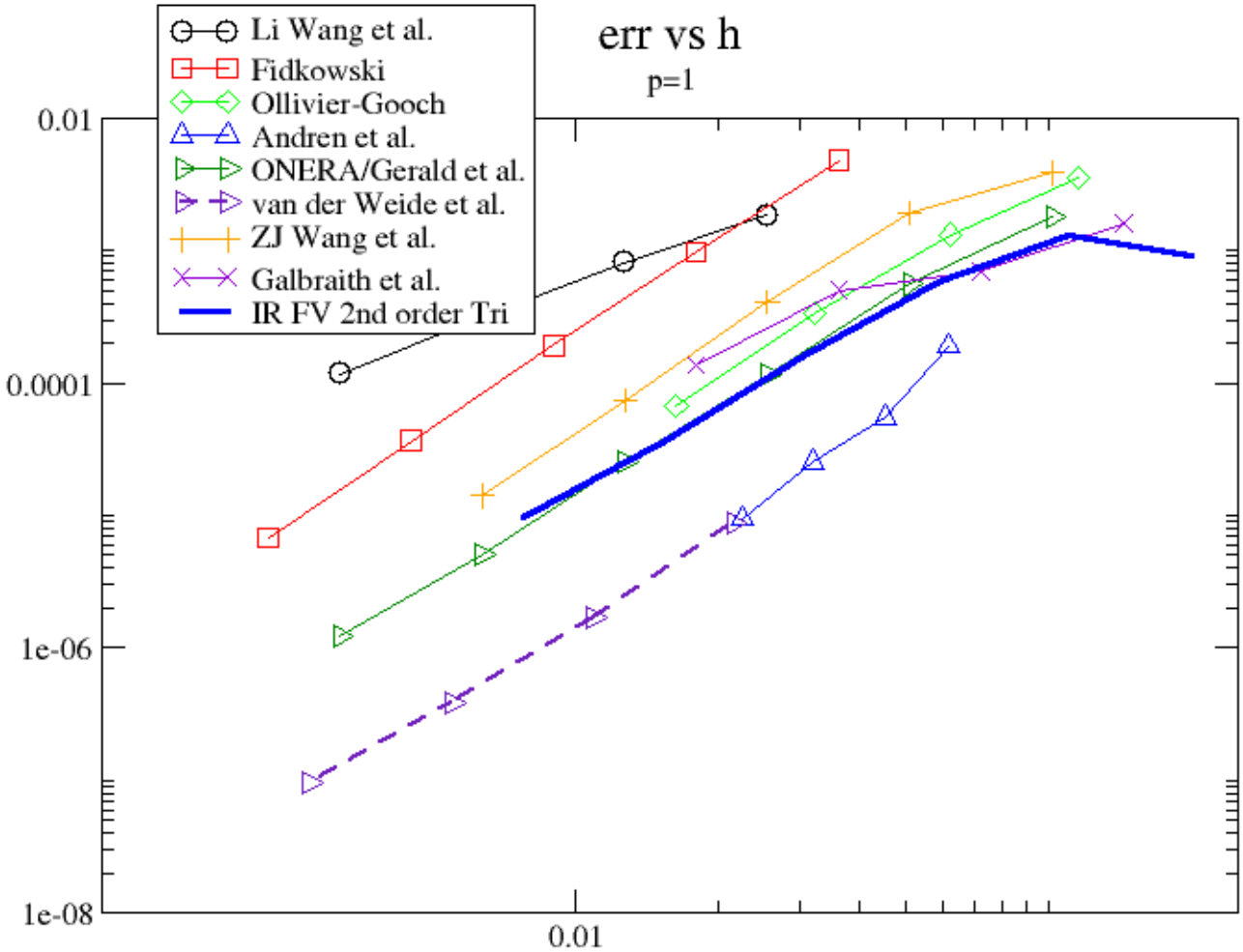
Error/work/participants

p=0



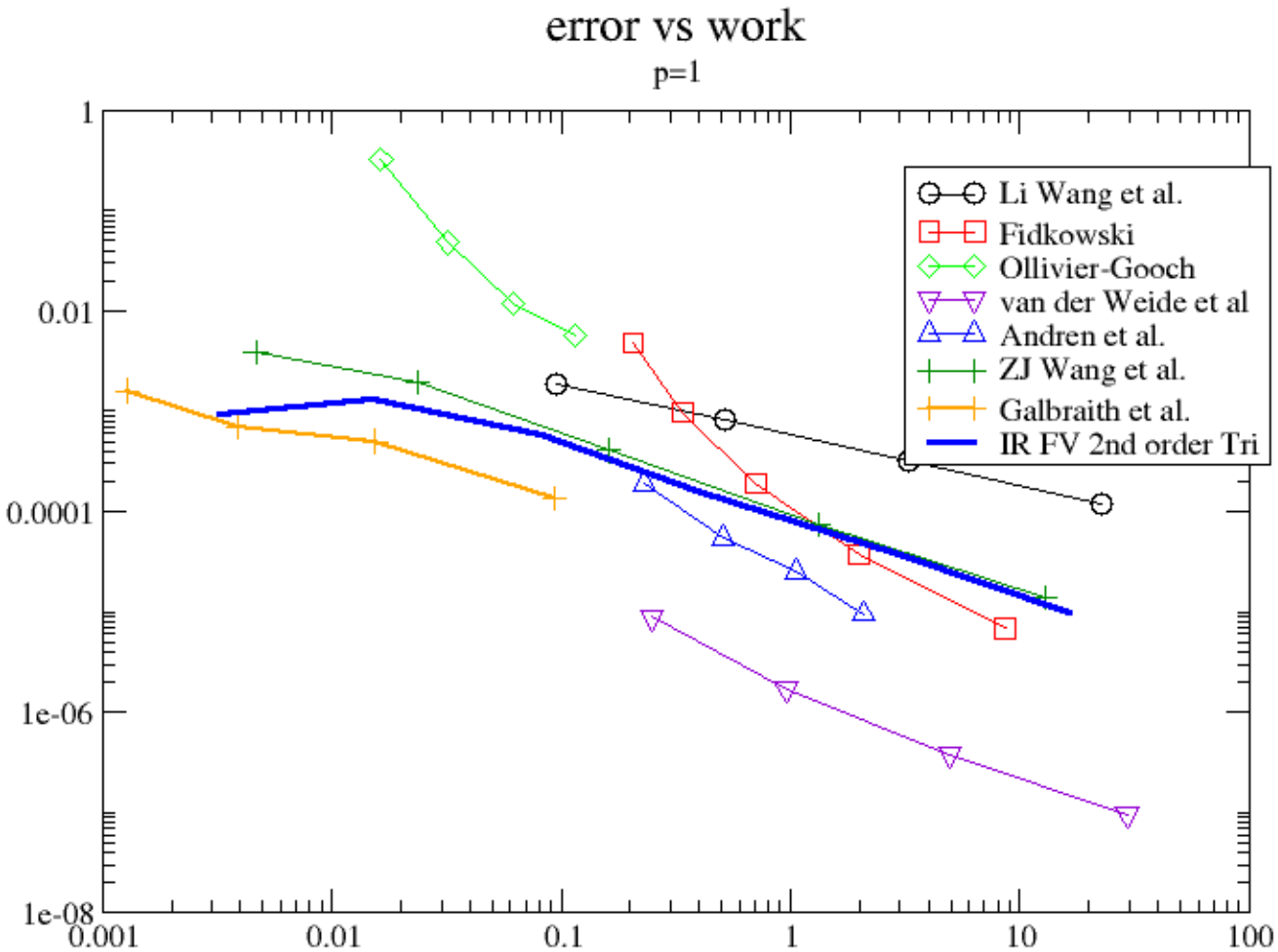
Error/work/participants

p=1



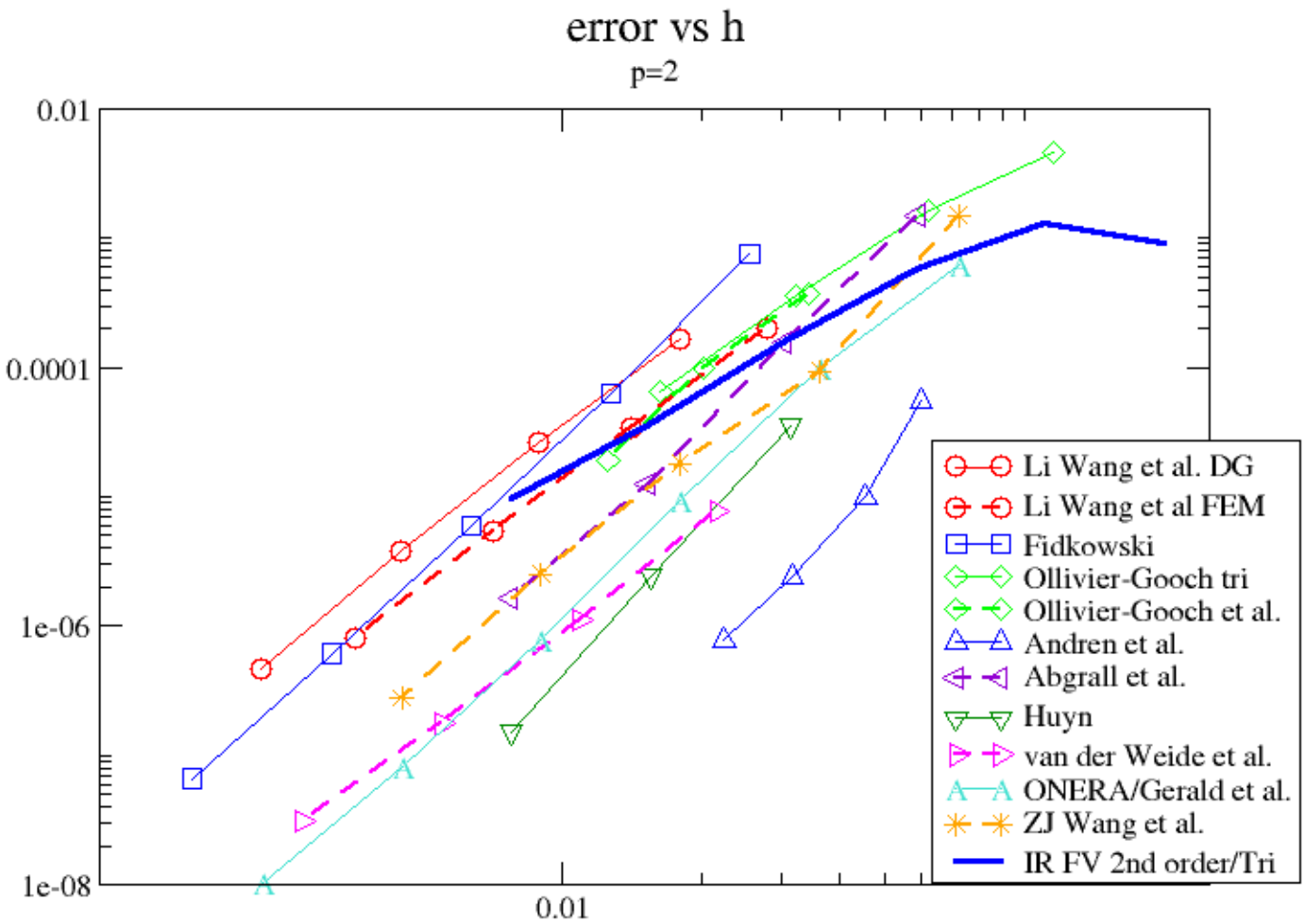
Error/work/participants

p=1



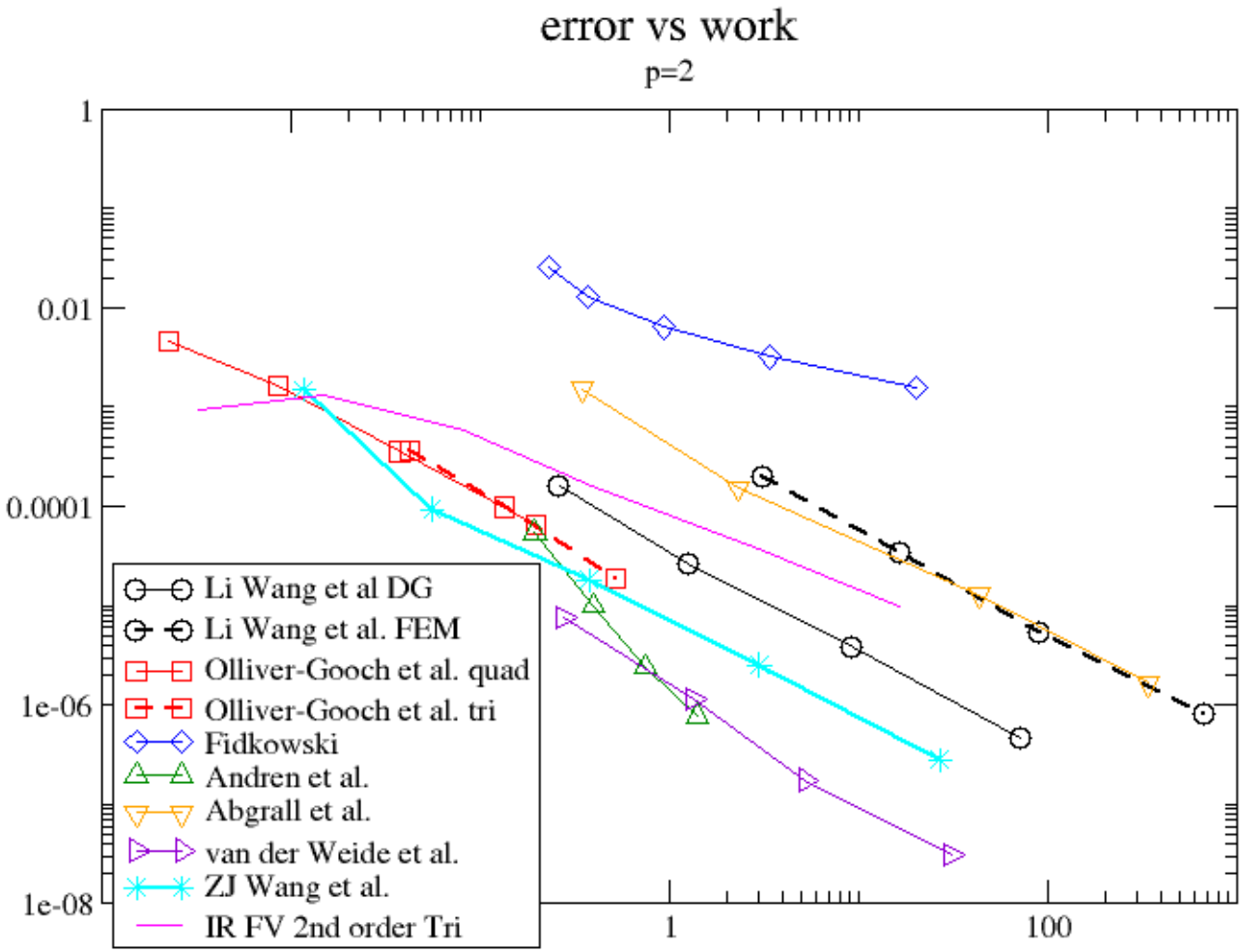
Error/work/participants

p=2



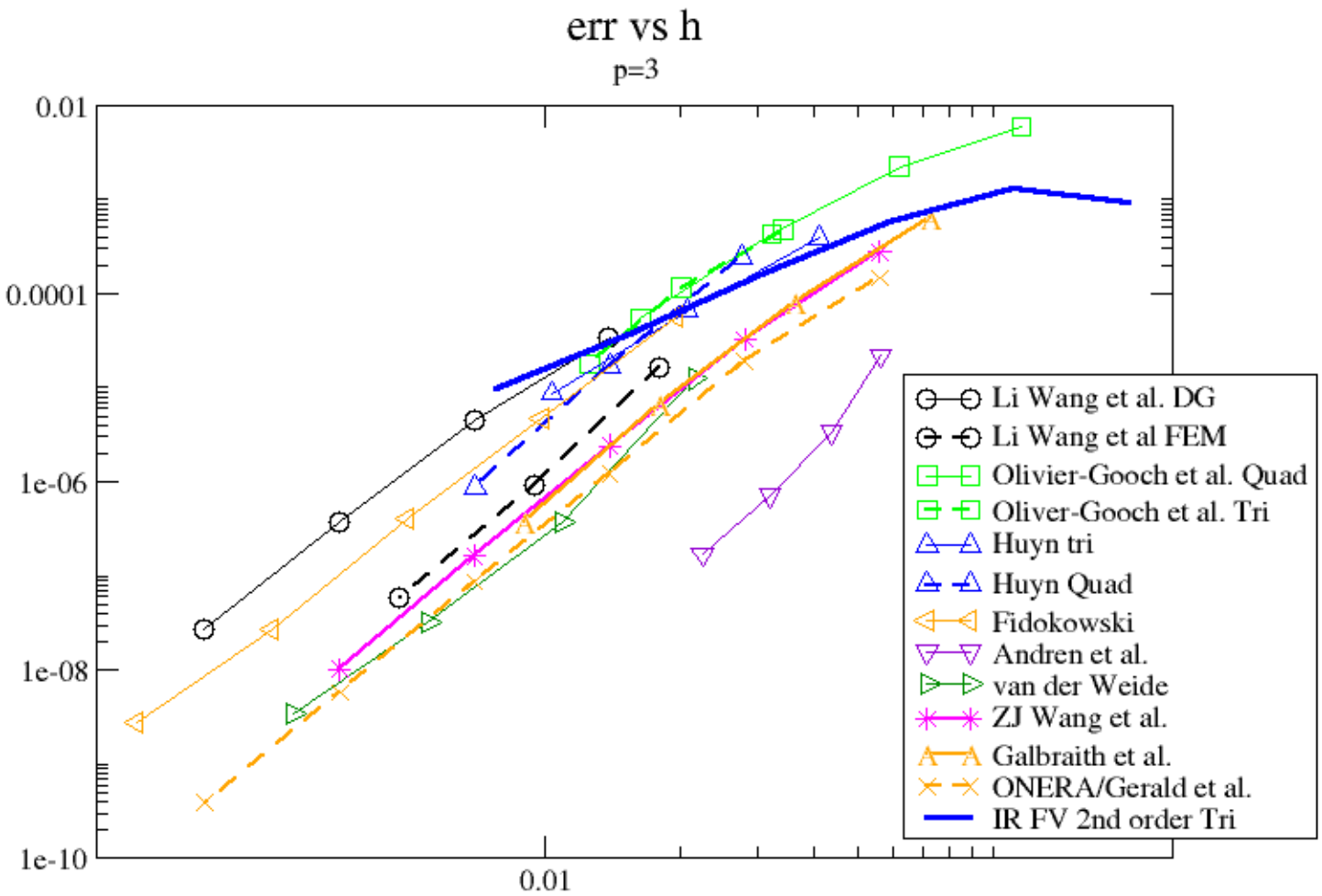
Error/work/participants

p=2



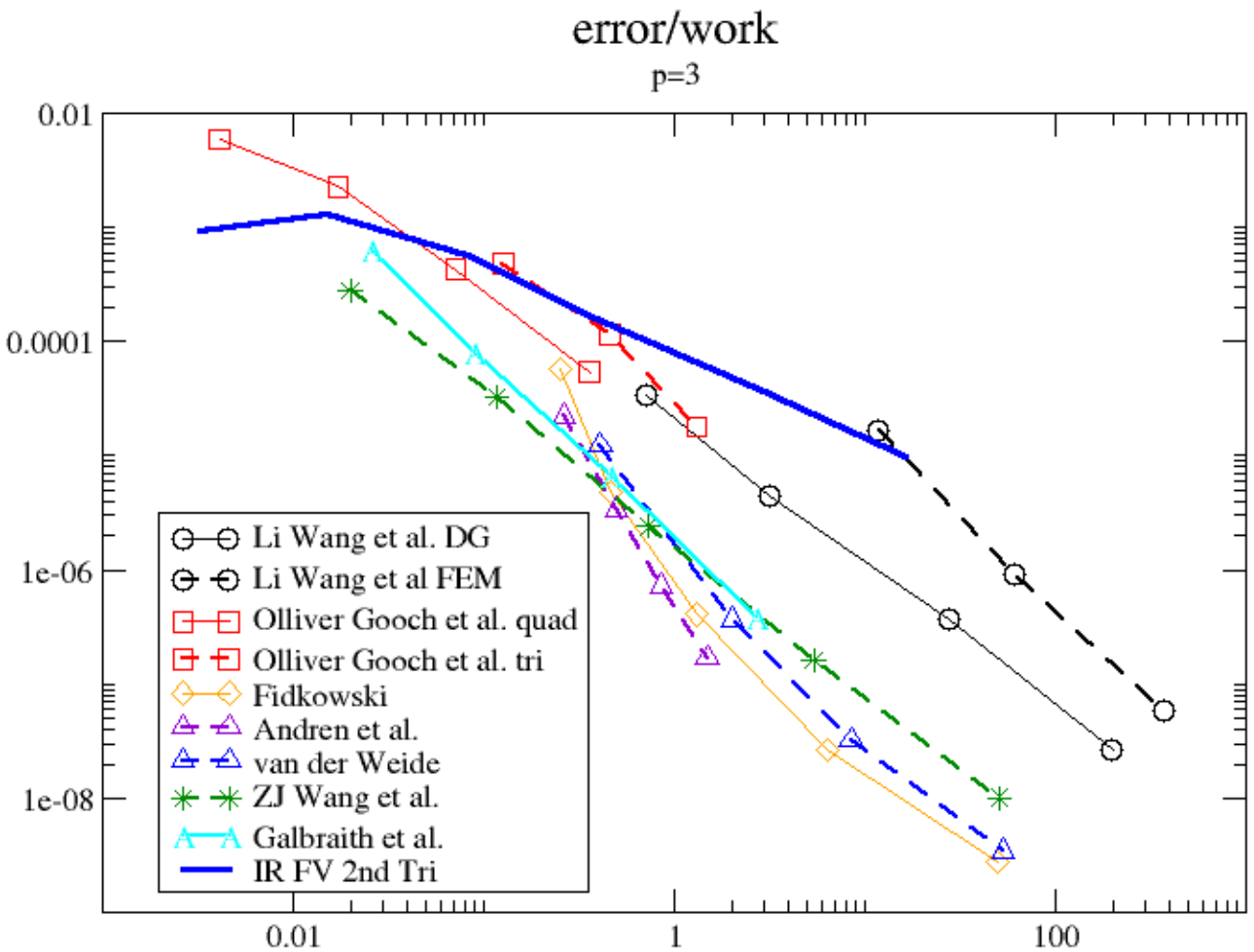
Error/work/participants

p=3



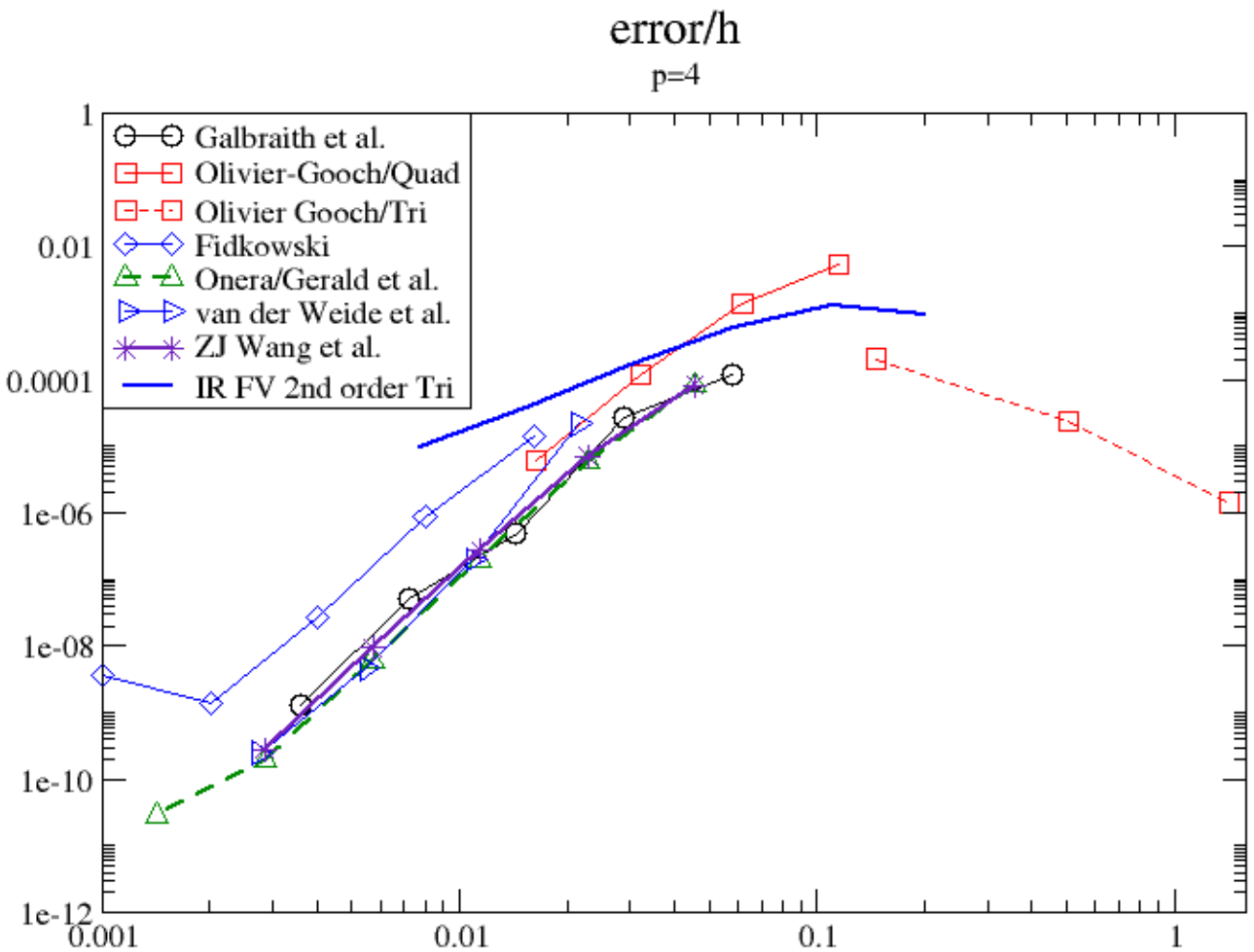
Error/work/participants

p=3



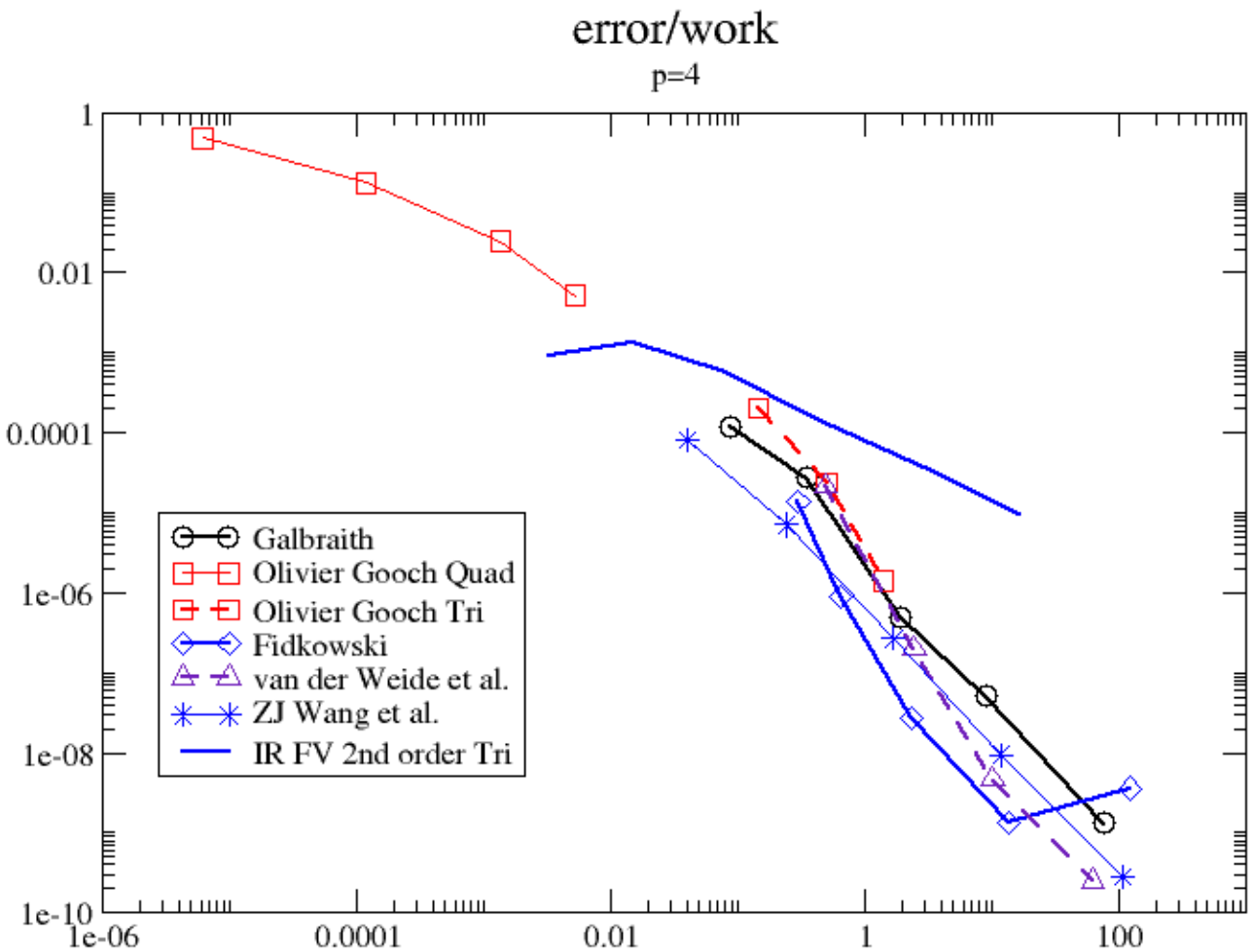
Error/work/participants

p=4



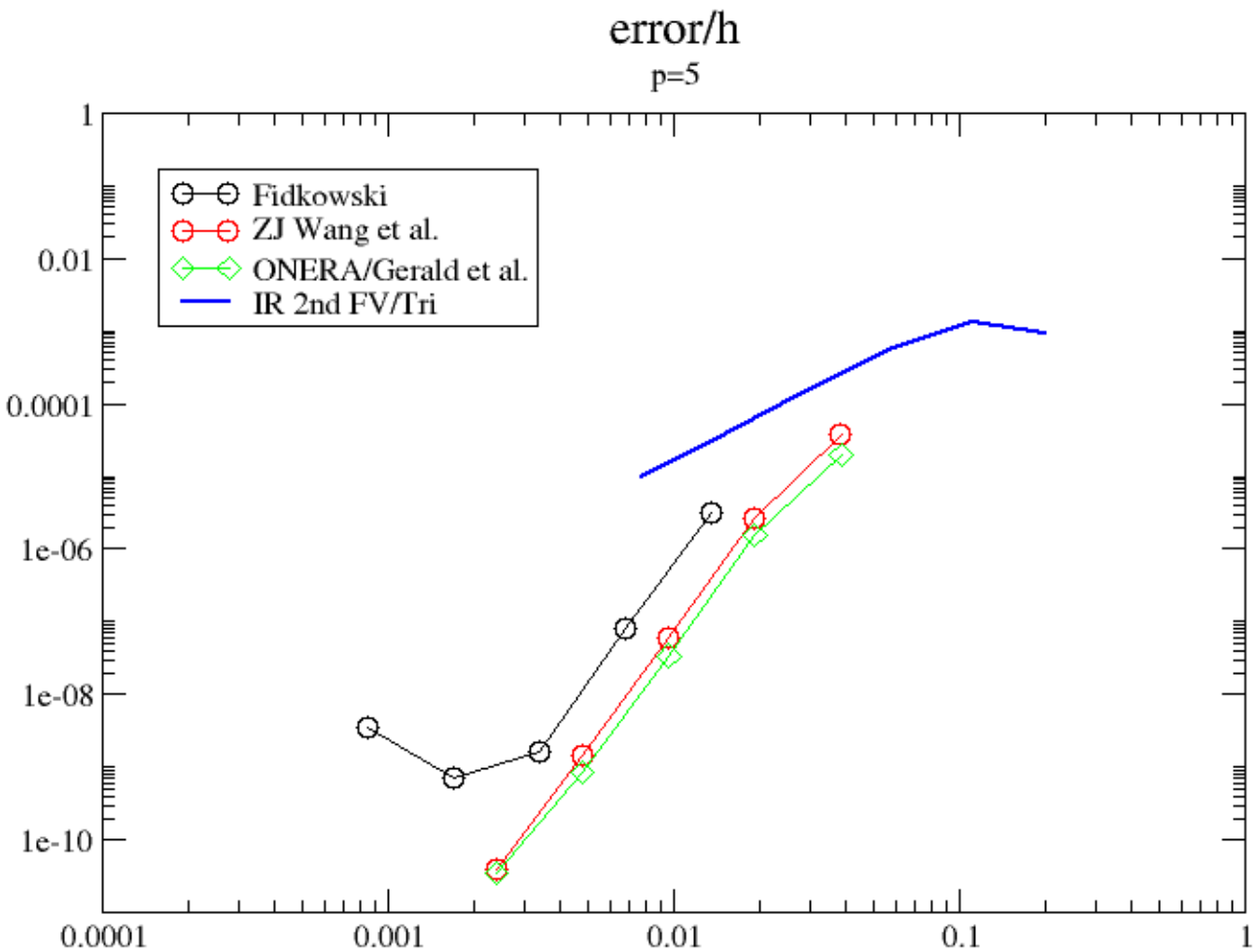
Error/work/participants

p=4



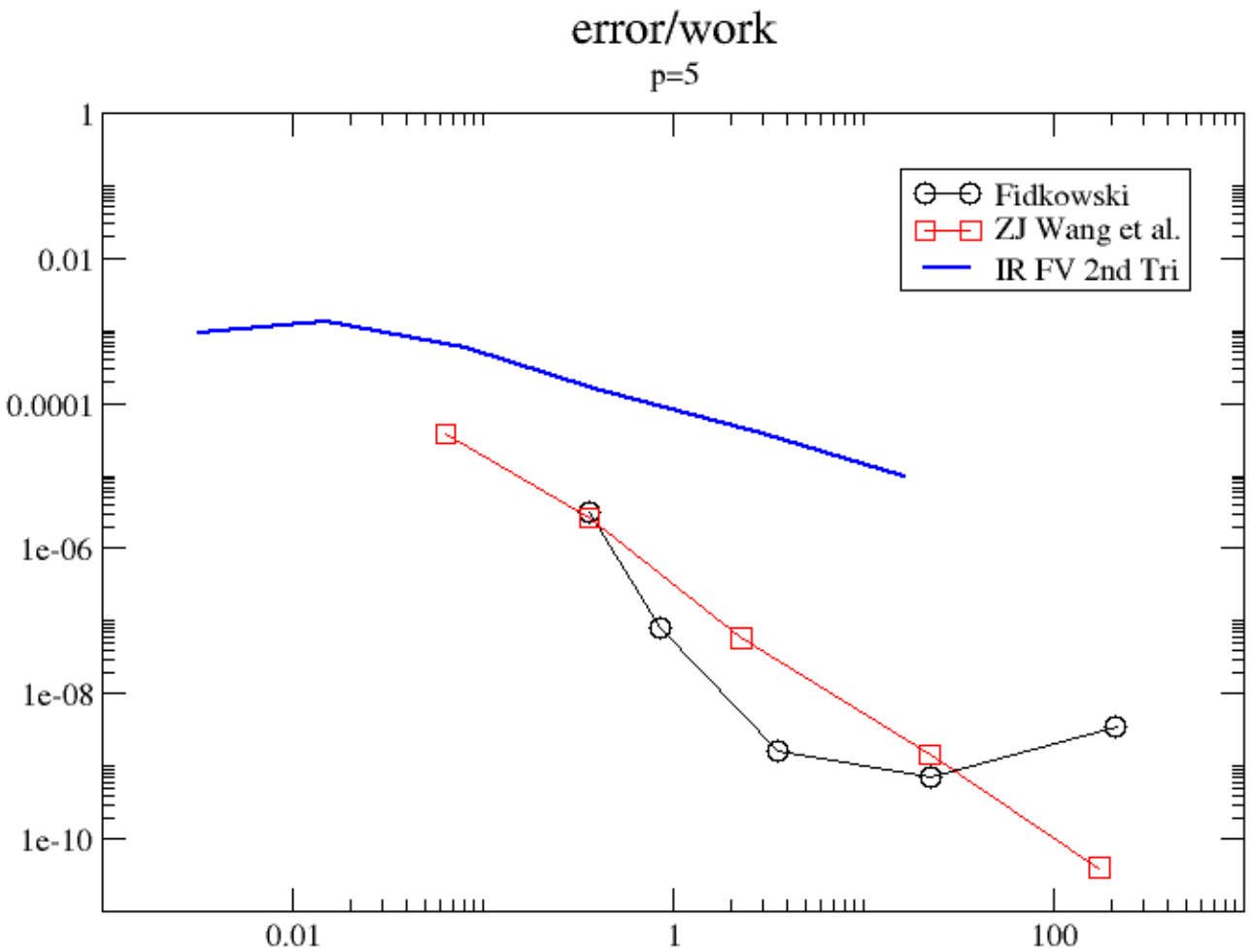
Error/work/participants

p=5



Error/work/participants

p=5



Summary

Methods

FV/WENO, DG (various versions), FEM (linear), FEM (non linear: RD)

Accuracy

Efficiency

Summary

Methods

FV/WENO, DG (various versions), FEM (linear), FEM (non linear: RD)

Accuracy

- All methods perform equivalently.

Efficiency

Summary

Methods

FV/WENO, DG (various versions), FEM (linear), FEM (non linear: RD)

Accuracy

- All methods perform equivalently.
- Maybe FV/WENO a little bit less accurate

Efficiency

Summary

Methods

FV/WENO, DG (various versions), FEM (linear), FEM (non linear: RD)

Accuracy

- All methods perform equivalently.
- Maybe FV/WENO a little bit less accurate
- May be I have misunderstood the data or the participants, is that correct ?

Efficiency

Summary

Methods

FV/WENO, DG (various versions), FEM (linear), FEM (non linear: RD)

Accuracy

- All methods perform equivalently.
- Maybe FV/WENO a little bit less accurate
- May be I have misunderstood the data or the participants, is that correct ?

Efficiency

- Each method do not perform equivalently, even for one given group

Summary

Methods

FV/WENO, DG (various versions), FEM (linear), FEM (non linear: RD)

Accuracy

- All methods perform equivalently.
- Maybe FV/WENO a little bit less accurate
- May be I have misunderstood the data or the participants, is that correct ?

Efficiency

- Each method do not perform equivalently, even for one given group
- Art of coding: important issue.

Summary

Methods

FV/WENO, DG (various versions), FEM (linear), FEM (non linear: RD)

Accuracy

- All methods perform equivalently.
- Maybe FV/WENO a little bit less accurate
- May be I have misunderstood the data or the participants, is that correct ?

Efficiency

- Each method do not perform equivalently, even for one given group
- Art of coding: important issue.
- What are the data structure ? Weight of the implicit method, cache effects, numbering issues of dofs, parallel solver, partitionner, etc are maybe the most important factors.

A classical example of how to make a code slow

Related to numering issues

Case	Code	Ratio
Random in	tableau(j,i)= SIN(tableau(jindice(j),indice(i)))	8
Random out	tableau(jindice(j),indice(i))= SIN(tableau(j,i))	6
Regular	tableau(j,i)=SIN(tableau(j,i))	1

Only difference: indice(:) and jindice(:): random affectation of indices