

## INTERFACE CONTROL VOLUME FINITE ELEMENT METHOD

**Ahmad S. Abushaikha<sup>1</sup>, Martin J. Blunt<sup>2</sup> and Olivier R. Gosselin<sup>3</sup>, Christopher C. Pain<sup>4</sup>,  
Matthew D. Jackson<sup>5</sup>**

<sup>1</sup> Imperial College London/ Qatar Foundation R&D, London SW7 2AZ, United Kingdom,  
a.abushaikha08@imperial.ac.uk

<sup>2</sup> Imperial College London, London SW7 2AZ, United Kingdom, m.blunt@imperial.ac.uk

<sup>3</sup> Imperial College London/ TOTAL E&P, London SW7 2AZ, United Kingdom,  
o.gosselin@imperial.ac.uk

<sup>4</sup> Imperial College London, London SW7 2AZ, United Kingdom, c.pain@imperial.ac.uk

<sup>5</sup> Imperial College London, London SW7 2AZ, United Kingdom, m.d.jackson@imperial.ac.uk

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We present a new numerical method to improve the modelling of multi-phase fluid flow in highly heterogeneous and fractured hydrocarbon reservoirs, called interface control volume finite element (ICVFE). The method drastically decreases the smearing effects in other node CVFE methods, while being mass conservative and numerically consistent. The pressure is computed at the interfaces of elements, and the control volumes are constructed around them. This assures that a control volume straddles, at most, two elements, which decreases the fluid smearing between neighbouring elements when large variations in their material properties are present. Lowest order Raviart-Thomas vectorial basis functions [1] are used for the pressure calculation and Lagrange basis functions [2] are used to compute fluxes. The method is a combination of mixed hybrid finite element and node control volume finite element methods [3, 4]. Its accuracy and convergence are tested using three dimensional tetrahedron elements to represent heterogeneous reservoirs. Our new approach is shown to be more accurate than current methods in the literature.

### REFERENCES

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