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HOURGLASS CONTROL BY MEANS OF THE VIRTUAL ELEMENT METHOD

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The 8-node three-dimensional and 4-node two-dimensional isoparametric elements are widely used in computational mechanics. In order to perform fast calculations, one-point integration is often used; however, it is well-known that such an approximation gives rise to spurious singular modes, which are referred to as hourglass modes in the solid mechanics literature. Several techniques have been proposed to deal with this phenomenon, starting from the seminal paper of Flanagan and Belytschko [1].

In this talk, we will show how the recently introduced Virtual Element Method (VEM) addresses the problem of hourglass control, recovering the Flanagan-Belytschko stabilization in a much more general setting and proving rigorously the convergence of the method.

REFERENCES

[1] D. P. Flanagan and T. Belytschko, A uniform strain hexahedron and quadrilateral with orthogonal hourglass control, *International Journal for Numerical Methods in Engineering*, 17 (1981) 679–706.