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A COMPACT GEOMETRICALLY NONLINEAR FE SHELL CODE FOR CARDIAC ANALYSIS: SHELL FORMULATION

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3D FEA of the electro-mechanical response of the human heart has typically been undertaken using tetrahedral or hexahedral elements [1]. Layered shell elements provide an attractive alternative since they can involved fewer degrees of freedom to achieve an equivalent precision.

The challenge of identifying an optimal shell element formulation for geometrically (and materially) nonlinear analyses remains open.

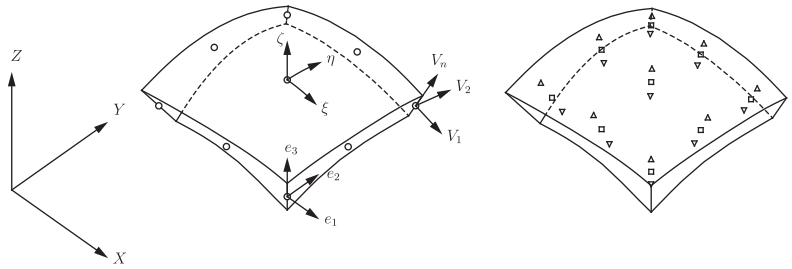

Figure 1: 9-noded shell element (left) with integration point locations (right)

In addition to presenting the key equations required for the analysis, a new compact MATLAB script for a *Total-Lagrangian* scheme is included in the paper. Comparisons are made between the performance of this code and an existing hexahedral FE code [2]. Two benchmark problems are examined. It is shown that there are significant run-time savings using the shell formulation.

REFERENCES

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