

































**Fig. 5** Through-thickness distributions of stresses for a hybrid three-layer cylindrical shell: SaS formulation for  $\gamma = 2$  and  $l_1 = l_2 = l_3 = 13$

## 7. CONCLUSIONS

A robust SaS formulation for the coupled steady-state thermal stress analysis of layered piezoelectric shells has been proposed. It is based on a new concept of SaS located at Chebyshev polynomial nodes throughout the layers and interfaces as well. As a result, the developed SaS formulation gives an opportunity to obtain the Ritz solutions for layered cylindrical shells with embedded piezoelectric sensors and actuators with a prescribed accuracy, which can asymptotically approach the 3D exact solutions of thermopiezoelectricity as the number of SaS goes to infinity.

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