Verification type	Analytical Solutions
Database reference	ANA-3
Topic / Application	Discretisation scale Length Scale
Physics	Laminar Premixed Hydrogen-Air Flames
Summary	The Paper identifies the spatial discretization required to capture all detailed continuum physics in the reaction zone for one-dimensional steady laminar premixed hydrogen-air flames.
Description	The required spatial discretization to capture all detailed continuum physics in the reaction zone for one-dimensional steady laminar premixed hydrogen-air flames. The method reveals that the finest length scale is at the micron-level, which is an order of magnitude less than the scales employed in nearly all multi-dimensional and/or unsteady laminar premixed flame simulations in the literature. A verification calculation is performed to reproduce the temperature and species profiles of a stoichiometric, atmospheric pressure hydrogen-air flame found in Smooke et al. Smooke, M. D., Miller, J. A., and Kee, R. J., "Determination of Adiabatic Flame Speeds by Boundary Value Methods," Combustion Science and Technology, Vol. 34, Nos. 1-6, 1983, pp. 79-90
Case Title	Verified Computations of Laminar Premixed Flames
Authors	Ashraf N. Al-Khateeb∗ , Joseph M. Powers† , and Samuel Paoucci
Year	2007
Online reference	45th AIAA Aerospace Science Meeting and Exhibit, 8-11 January 2007, Reno, Nevada

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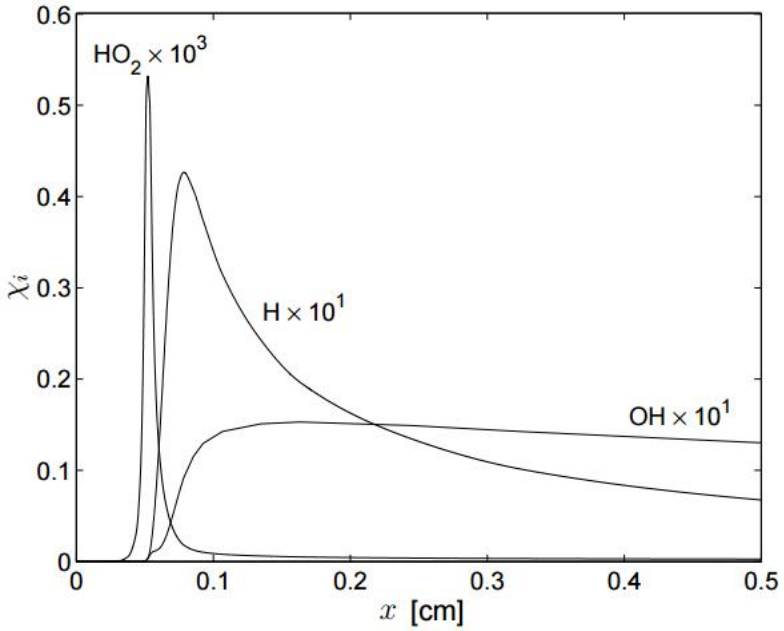
Case image	 species profiles vs. distance in a stoichiometric hydrogen-air flame for numerical verification, equivalent to predictions of Smooke et al., 4 To = 298 K, po = 1 atm
Governing equations	
Results	

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