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A Three-dimensional Contact Algorithm for Sliding Surface Based on Triangular Subdivision Local Search in high pressure YUXI JIANG, HAIBING ZHOU, SHUDAO ZHANG, Institute of Applied Physics and Computational Mathematics, China — The Lagrangian approach is the natural choice to model the interface movement of the matter in high pressure. The contact algorithm is one of the most crucial parts of the Lagrangian simulation and the local contact search which is to find for a node's contact point on the interface is the important part of the contact algorithm. The efficient local contact search algorithms were rarely achieved expect the node-to-segment algorithm, pinball algorithm and the inside-outside algorithm. These algorithms are either time consuming and unstable when the mesh is severely distorted or not always suitable for applications involving high explosives. Within our computational group at IAPCM, the shock compressed dynamical problems are modeled using CHAP3D code developed upon the compatible Lagrangian numerical methods. In the contact algorithm in CHAP3D code, a triangular subdivision local contact search algorithm has been developed. A shape heart is introduced by averaging the positions of the four contact segment nodes in this method. Then a four-node quadrilateral contact surface segment may be subdivided into four triangular sub-segments which normal vectors are confirmed. Therefore the contact point is achieved by the geometry method. The applications of sliding explosion simulations show the efficiency and robustness of this contact algorithm.

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