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**3D DSD Calculation in a Rectangular Bar by the Direct Algorithm** YEHUDA PARTOM, RAFAEL — According to detonation shock dynamics (DSD), the normal front velocity at any point on a detonation front is  $D_n(k)$ , where k is the local mean curvature. In rectangular coordinates a point on the front therefore moves according to:  $dx/dt=D_n\cos(n,x)$ ,  $dy/dt=D_n\cos(n,y)$  and  $dz/dt=D_n\cos(n,z)$ . The direct DSD algorithm makes use of these simple equations. We define the detonation surface by putting discrete points on it as densely as needed. At each point we have the above three ODEs. For m such points we therefore have a system of 3m ODEs. We propagate the front by solving them simultaneously, where we calculate the mean curvature k by a finite difference approximation. At the boundaries we apply the limiting angle constraint. In the paper we demonstrate the use of the direct algorithm for a special relatively easy case of detonation in a bar with a rectangular cross section, with different values of a/b. We compute the size effect curves and compare with the diameter effect curve of a circular bar of the same cross section area.

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