

The following simple test regards the evolution of a straight line which evolves with a linear normal velocity

$$V_n = x_1$$

in the plane  $(x_1, x_2)$ . Theoretically, the straight line is expected to remain a straight line and to rotate around the origin. This is what we observe in the simulation. Moreover, we remark that the velocity of rotation of the straight line decreases as it approaches to the zero velocity axis. This comes from the fact that the normal velocity is small near this axis.

This simulation have been made with a new fast algorithm to track fronts evolving with normal velocity that can change its sign in space and time (see the work in progress of Carlini, Falcone, Forcadel and Monneau and the proceedings of Carlini, Cristiani, Forcadel, “ A non-motome Fast Marching scheme for a Hamilton-Jacobi equation modeling dislocation dynamics”). This is a generalisation of the classical Fast Marching Method introduced by Sethian which is concerned with monotonically advancing fronts.