

Motion of solids involving collisions

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Let consider a deformable solid evolving above a plane. During its motion it may collide the plane. We investigate the collision phenomenon, i.e., the collision time is known and the unknown is the velocity field after collision. We prove that within reasonable mechanical assumptions this problem has one and only one collision.

Then we investigate the motion of the solid, i.e., the collisions time are not known. There may be many and they may accumulate. We prove, again that within reasonable mechanical assumptions, that there is a motion which has bounded variation with respect to time and smooth behaviour with respect to space. Moreover we prove that the kinetic energy is a bounded variation function in as required by mechanics. When the collision times accumulate, we prove that the motion which follows the accumulation time is smooth and has a zero initial velocity.