A "Patched Conics" Description
of the Swing-By of a Group of Particles

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Abstract: We study the close approach between a planet and a cloud of particles. It is assumed that the dynamical system is formed by two main bodies in circular orbits and a cloud of particles in planar motion. The goal is to study the change of the orbit of this cloud after the close approach with the planet. It is assumed that all the particles have semi-major axis $a \pm \Delta a$ and eccentricity $e \pm \Delta$e before the close approach with the planet. It is desired to known those values after the close approach.