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**Evolution of a dipole in two-dimensional flows** YUKO MATSUMOTO, TSUNENARI SAITO, KAZUYUKI UENO, Tohoku University — A simple model for the motion of a dipole in background flows is presented. The dipole is characterized by three time-dependent variables: position, dipole moment and radius. The motion of a dipole is described by the system of differential equations for the characteristic variables, which are derived from the conservation of momentum and Kelvin's circulation theorem. The equations predict analytically that the evolution of the dipole depends on the velocity gradient of the ambient flow along dipole's axis. For the case of that the velocity gradient is positive, the dipole should be stretched in its axis direction. On the other hand, when the velocity gradient is negative, vortices of the dipole will be separated. These predictions are confirmed by numerical simulations with the vortex method.

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