The Motion of Pluto

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Pluto's motion is said to be chaotic in the sense that the maximum Lyapunov exponent is positive. The longest integration over 845 million years (42 Pluto's Lyapunov times) by Sussman and Wisdom(1988) does not show any indication of a gross instability in the motion of Pluto. We have carried out the numerical integration of Pluto over the age of the solar system (5.5 billion years both towards the past and the future). This integration also does not give any indication of chaotic evolution of Pluto. The divergences of Keplerian elements of a nearby trajectory at first grow linearly with the time and then start to increase exponentially. The exponential divergences stop at about 420 million years and saturate. The exponential divergences are suppressed by the following three resonances that Pluto has:
1)Pluto is in the 3:2 mean motion resonance with Neptune.
2)The argument of perihelion librates around 90 degrees and its period is 3.8 Myr. The dominant periodic variations of the eccentricity and the inclination are synchronized with the libration of the argument of perihelion.
3)Moreover the longitude of Pluto's node referred to the longitude of Neptune's node circulates and the period of this circulation is equal to the period of the libration of the argument of perihelion (a secondary resonance).

Several possible scenarios how Pluto evolves to the present stable state will be reviewed.