In non-adaptive integration method, the integration is executed all throughout with a fixed Δt. But, in adaptive integration method it computes Δt, on the fly, such that Δt is large, when $x(t)$ varies slowly and Δt is small when $x(t)$ varies rapidly. That means, adaptive methods, unlike non-adaptive methods, recomputes Δt at each timestep.

When the problem to be solved is slow varying, and takes multiple orders of magnitude of evaluation, in other word, in case of stiff differential equations, adaptive methods are generally useful.

disadvantages:

- adaptive integration algorithms may take huge computation time.
- Simulation of dynamic systems with several state equations can be computationally expensive.