$y' = y$

$k_1 = f(u_n) = u_n$

$k_2 = f(u_n + hk_1) = u_n + h u_n = u_n(1+h)$

$u_{n+1} = u_n + \frac{h}{2}(k_1 + k_2) = u_n + \frac{h}{2}(u_n + (1+h)u_n)$

$= u_n\left(1 + h + \frac{h^2}{2}\right)$

$= u_n + \frac{h}{2}u_n + \frac{h}{2}(1+h)u_n$

$= u_n + \frac{h}{2}u_n + \frac{h}{2}u_n + \frac{h^2}{2}u_n$

$y' = 2y$

$k_1 = f(u_n) = 2u_n$

$k_2 = f(u_n + hk_1) = 2(u_n + hk_1)$

$= 2(u_n + 2h u_n)$

$= 2u_n(1 + 2h)$

$u_{n+1} = u_n + \frac{h}{2}(k_1 + k_2) = u_n + \frac{h}{2}(2u_n + 2u_n(1+2h))$

$= u_n + h u_n + h u_n(1+2h)$

$= u_n + h u_n + h u_n + 2h^2 u_n$

$= u_n(1 + 2h + 2h^2)$