Pseudocode 8

Ex. 8.4

$\frac{d\theta}{dt} \Rightarrow \omega$

$\frac{d\omega}{dt} = -g/\ell \sin\theta$

$\Rightarrow f(r,t)$ — Input

Solve RK4

↳ $r = \frac{1}{6}(K_1 + K_2 + K_3 + K_4)$

Output

↳ r → [x vs t]

Ex 8.5 a)

$\frac{d}{dt}\begin{pmatrix} \theta = \omega \\ \omega = -\frac{g}{\ell}\sin\theta + C\sin\Omega t \cdot \cos\theta \end{pmatrix}$

Input :- $f(\omega, t)$

Solve [RK4]

↳ K_1, K_2, K_3, K_4

$r = \frac{1}{6}(K_1 + K_2 + K_3 + K_4)$

Extract $\theta(t)$, plot against t

b)

Input $f(\Omega, r, t)$

↓

Ω : range [min, max]

↳ solve RK4 for each Ω

↳ find max amp.

Plot max amp. Ω

↳ choose $\Omega \rightarrow$ max(max amp.)

Ex 8.2

$\frac{dx}{dt} = \alpha x - \beta xy$

$\frac{dy}{dt} = \delta xy - \delta y$

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↳ solve RK4

↳ Output r (x and y(t)) overplot