

## MODIFIED EULER'S ONE-STEP METHOD:

$$y'(t) = f(x(t))$$

$$y_0 = y(x=0)$$

$$k_1 = f(\mu_n)$$

$$k_2 = f(\mu_n + h k_1)$$

$$\mu_{n+1} = \mu_n + \frac{h}{2} (k_1 + k_2)$$

} RUNGE-KUTTA APPROXIMATION

$$\tilde{\mu}_{n+1} = \mu_n + h f(\mu_n) \quad \text{Prediction (Euler)}$$

$$\mu_{n+1} = \mu_n + \frac{h}{2} (f(\mu_n) + f(\tilde{\mu}_{n+1})) \quad \text{Correction}$$

} PREDICTION-CORRECTION APPROXIMATION

AN EXAMPLE: ①  $y' = y$ ,  $y(0) = 1$ ,  $y(1) = \dots$

②  $f(y) = y$ ,  $k_1 = f(\mu_n) = \mu_n$   
 $k_2 = f(\mu_n + h k_1) = \mu_n + h k_1 = \mu_n + h \mu_n$   
 $\rightarrow = (1+h)\mu_n$