

(a) Main or "Driver" Program

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Assign values for
n = number of equations
yi = initial values of n dependent
    variables
xi = initial value independent
    variable
xf = final value independent variable
dx = calculation step size
xout = output interval

```

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x = xi
m = 0
xpm = x
DO i = 1, n
    ypi,m = yi
END DO
DO
    xend = x + xout
    IF (xend > xf) THEN xend = xf
    h = dx
    CALL Integrator (x, y, n, h, xend)
    m = m + 1
    xpm = x
    DO i = 1, n
        ypi,m = yi
    END DO
    IF (x ≥ xf) EXIT
LOOP
DISPLAY RESULTS
END

```

(b) Routine to Take One Output Step

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SUB Integrator (x, y, n, h, xend)
DO
    IF (xend - x < h) THEN h = xend - x
    CALL RK4 (x, y, n, h)
    IF (x ≥ xend) EXIT
END DO
END SUB

```

(c) Fourth-Order RK Method for a System of ODEs

```

SUB RK4 (x, y, n, h)
CALL Derivs (x, y, k1)
DO i = 1, n
    ymi = yi + k1i * h / 2
END DO
CALL Derivs (x + h / 2, ym, k2)
DO i = 1, n
    ymi = yi + k2i * h / 2
END DO
CALL Derivs (x + h / 2, ym, k3)
DO i = 1, n
    yei = yi + k3i * h
END DO
CALL Derivs (x + h, ye, k4)
DO i = 1, n
    slopei = (k1i + 2*(k2i+k3i)+k4i)/6
    yi = yi + slopei * h
END DO
x = x + h
END SUB

```

(d) Routine to Determine Derivatives

```

SUB Derivs (x, y, dy)
dy1 = ...
dy2 = ...
END SUB

```