

Math 307 Midterm Equation Sheet

- $y' = f(t, y)$
- $y' = f(t)g(y)$
- $\int \frac{dy}{g(y)} = \int f(t) dt$
- $y' + p(t)y = g(t), y(t_0) = y_0$
- $\mu(t) = e^{\int p(t) dt}$
- $y = \frac{1}{\mu(t)}(\int \mu(t)g(t) dt + c)$
- $y' = ry + k, T' = k(T - T_S), v' = \pm g - \frac{m}{k}v$
- $t_{n+1} = t_n + h, y_{n+1} = y_n + f(t_n, y_n)h$
- $\phi_0(t) = 0, \phi_{n+1}(t) = \int_0^t f(s, \phi_n(s)) ds$
- $y'' = f(t, y, y')$
- $y'' + p(t)y' + q(t) = g(t), y(t_0) = y_0, y'(t_0) = y'_0$
- $ay'' + by' + cy = 0$
- $ar^2 + br + c = 0$
- $r = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- $W(y_1, y_2) = \begin{vmatrix} y_1 & y_2 \\ y_1' & y_2' \end{vmatrix} = y_1 y_2' - y_1' y_2$
- $y = c_1 e^{r_1 t} + c_2 e^{r_2 t}, y = c_1 e^{rt} + c_2 t e^{rt}, y = c_1 e^{at} \sin(bt) + c_2 e^{at} \cos(bt)$
- $y_2(t) = v(t)y_1(t)$