

At the final exam, this page of formulas will be handed out for you to use during the exam.

1. Variation of Parameters

$$y_p(x) = -y_1(x) \int \frac{y_2(x)f(x)}{y_1(x)y_2'(x) - y_1'(x)y_2(x)} dx + y_2(x) \int \frac{y_1(x)f(x)}{y_1(x)y_2'(x) - y_1'(x)y_2(x)} dx$$

2. $2 \sin A \sin B = \cos(A - B) - \cos(A + B)$

3. $\cos(u + v) = \cos u \cos v - \sin u \sin v$

4. $\cos(u - v) = \cos u \cos v + \sin u \sin v$

5.

$$mx'' + cx' + kx = F_0 \sin \omega t$$
$$x_{sp}(t) = \frac{F_0}{\sqrt{(k - m\omega^2)^2 + (c\omega)^2}} \sin(\omega t - \alpha)$$
$$\alpha = \tan^{-1} \frac{c\omega}{k - m\omega^2}, \quad 0 \leq \alpha \leq \pi$$