ernal force,
g-mass system

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d of the forcing
center of mass

for both the
olutions to the
ly. First, the
s equation:

the

$$y_c(t) = c_1 \cos \sqrt{\frac{k}{m}}\, t + c_2 \sin$$

and, since $w_0 = \sqrt{\frac{k}{m}}$, this leads to:

$$y_c(t) = c_1 \cos w_0 t + c_2 \sin w$$

Second, looking for a particular solution, we try y
Substituting, we obtain:

$$m\,(- A\, w^2 \sin wt) + k\,(A \sin w$$

So, $\quad A\,(- mw^2 + k) = F_0$

and therefore, $\quad A = F_0 \,/\, (- mw^2 + k) = F_0 \,/\, [r$

Letting w_0 = the natural period of the spring-mas

that:

$$A = F_0 \,/\, [m\,(w_0^2 - w^2)]$$

and therefore, $\quad y_p(t) = [F_0 / [m\,(w_0^2 - w^2)]]$ s

Therefore, the general solution is the linear comb
and complementary solutions:

$$y(t) = c_1 \cos w_0 t + c_2 \sin w_0 t + [F_0 / [m\,(w$$

Using the initial conditions of $y(0) = 0$ and y' (0)

$$y\,(0) = c_1 + 0 + 0 = 0$$
$$\longrightarrow c_1 = 0$$

$$y'\,(0) = 0 + w_0\, c_2 + w\, F_0 \,/[n$$

$$\longrightarrow c_2 = -\,(w/w_0)F_0 \,/[m(w_0^2 -$$

Our solution becomes: