

Table 1: Steady State Solutions for unforced SDOF Systems

| System               | Steady State Solution   |
|----------------------|---|
| Undamped Spring Mass | $\frac{v_0}{p} \sin(pt) + x_0 \cos(pt)$   |
| Damped Spring Mass   | $e^{-\zeta pt} \left[ \frac{v_0 + \zeta p x_0}{\sqrt{1 - \zeta^2} p} \sin(\sqrt{1 - \zeta^2} pt) + x_0 \cos(\sqrt{1 - \zeta^2} pt) \right]$ |

Table 2: Steady State Solutions for forced SDOF Systems

| System             | Steady State  | DMF<br>(or Amplitude Response)  | Transmissibility   |
|--------------------|---|---|--|
| Forced Spring Mass | $\left(\frac{F_0}{k}\right) \left(\frac{1}{1 - \left(\frac{\omega}{p}\right)^2}\right) \sin(\omega t)$    | $\frac{\mathbb{X}}{\delta_{\text{ST}}} = \frac{1}{\left 1 - \left(\frac{\omega}{p}\right)^2\right }$                          | $\frac{1}{\left 1 - \left(\frac{\omega}{p}\right)^2\right }$                               |
| Rotating Imbalance | $\frac{\tilde{m} e \omega^2 / k}{\left 1 - \left(\frac{\omega}{p}\right)^2\right } \sin(\omega t - \phi)$ | $\frac{M \mathbb{X}}{\tilde{m} e} = \frac{\left(\frac{\omega}{p}\right)^2}{\left 1 - \left(\frac{\omega}{p}\right)^2\right }$ | $\frac{1}{\left 1 - \left(\frac{\omega}{p}\right)^2\right }$                               |
| Base Excitation    | $a \left(\frac{1}{1 - \left(\frac{\omega}{p}\right)^2}\right) \sin(\omega t)$                             | $\frac{\mathbb{X}}{\delta_{\text{ST}}} = \frac{1}{\left 1 - \left(\frac{\omega}{p}\right)^2\right }$                          | $\frac{\left(\frac{\omega}{p}\right)^2}{\left 1 - \left(\frac{\omega}{p}\right)^2\right }$ |