

## INDEX

- Absorber, 224–226
- Absorber, optimal, 224–225
- Acceleration, 110, 115–116, 121–122
- Acceleration amplitude, 122
- Accelerometer, 122, 125, 126–127, 136
- Accelerometer design, 125–127
- Aerodynamic, 61–62
- Aerodynamic forces, 61–62
- Amplitude, 37, 44, 53–54, 55–57, 68, 72
- Amplitude, maximum, 68, 112
- Amplitude, peak, 113
  
- Bandwidth, 106, 107, 108–109
- Base excitation, 116–117, 119, 174–175, 183
- Beam, 273, 285–286, 291
- Beam, fixed-fixed, 298–300
- Beam rigid, 4
  
- Cantilever Beam, 3, 64, 271, 273, 275, 298, 300
- Convolution Integral, 160–161, 162, 165, 170, 175, 182–183
- Critically Damped System, 46–49, 159
  
- Damped spring–mass system, 57, 70
- Damper, 10, 22–23, 49, 129
  - pure rotational motion, 5–6, 11–12
  - pure translational motion, 5, 10–11
- Differential equation of motion, 3, 25–34
  
- Eigenvalue/Eigenvector, 197–198, 205, 240
- Equivalent Mass Constants, 12–13
  
- Equivalent Stiffness Constants, 12, 14, 17, 19, 21, 34, 60–61, 64–65, 299–301
- Equivalent Damping Constants, 12–13, 23, 25, 60–61
  
- Finite dimensional systems, 237–251
- Finite element analysis, 279, 295
- Force Transmissibility, 101–105
- Fourier Series Expansion, 138–139, 144–148, 151, 179
- Free vibration, 25–40
- Frequency Response Function, 138, 173, 176–178
  
- Infinite dimensional systems, 237–291
  
- LaPlace Transformation, 168–178, 184
- Logarithmic Decrement, 51, 53–55, 57
- Longitudinal Vibration, 15, 237, 250, 258–261, 279
  
- Mass, 5–8
- Mass moment of inertia, 5–8, 20, 31, 50, 60, 65, 79, 189, 234–235, 262
- Matrices, 187, 189–191, 194–195, 201–203, 231–234, 237–238, 240, 246
- Modal decomposition, 227, 229, 235, 237, 245–250, 296
- Mode shapes, 15, 192, 194, 196, 198, 231–232, 261, 273–274, 279, 295–296
- Motion
  - planar, 6–8
  - pure rotation, 5–6, 8–9–11
  - pure translation, 5–6, 8–10

- Natural Frequencies, 194, 196, 239, 251, 267, 284, 293  
 Non-viscous energy dissipation, 72, 128–131  
 Orthogonality, 140–141, 242, 244, 295–296  
 Overdamped System, 47–49, 111, 119, 159–160, 182–183  
 Particular integral, 84–85, 95, 97, 139, 151–153, 161, 201  
 Periodic force, 138, 149, 151, 179  
 Periodic function, 179  
 Planar motion, 7  
 Quality (Q) factor, 106  
 Rigid bar mass, 232  
 Rigid body, 6  
 Rotating unbalance, 113  
 Rotational motion, 5–9, 11, 190  
 Rotor-shaft system, 12–13, 14, 114–115, 234–235  
 SDOF system, 2, 4, 14, 16, 21–22, 25, 37, 40, 45, 47, 57, 63, 72, 80, 82, 88, 98, 113, 138–139, 162–163, 165, 171, 186, 206, 215, 220, 228–229, 246  
 Simply Supported Beam, 13, 269–270, 300–301  
 Sinusoidal excitation, 129  
 Single degree of freedom systems, 1–2, 72, 138, 186  
 Spring, 8–10  
   pure rotational motion, 6–8, 11–12  
   pure translational motion, 5–6, 10–11  
 Static equilibrium, 26–29, 38–39  
 Stiffness, 60, 184, 242  
 Torsional Vibration, 261–265  
 Transfer Function, 173, 175  
 Translational motion, 19–22  
 Transverse Vibration, 250–268  
 Undamped spring–mass system, 82, 194  
 Underdamped System, 44, 51–52, 56, 158  
 Unit Impulse Function, 155–156, 175, 264, 276  
 Unit Impulse Response, 156–159, 160–161, 167, 175, 182  
 Vibration Absorber, 212–224  
 Vibration Measuring Instruments, 72, 121–127  
 Vibratory system, 5, 10  
 Vibrometer, 122–124, 136  
   design, 124  
 Viscous damper, 12, 22, 128, 131  
   equivalent, 128, 131  
 Wave equations, 250–265