

ERRATA

COMPUTER-AIDED ANALYSIS OF MECHANICAL SYSTEMS

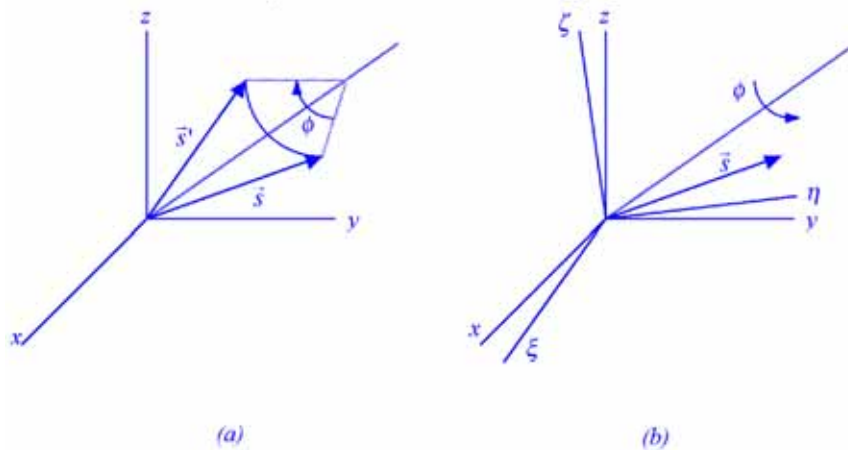
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Prentice-Hall, 1988

(Corrections as of November 2014)

Address to an error is given in the first column by the page number and in the second column by a line number, or a figure number, or an equation number. For example: “line 2” means the second line from the top of the page; “line -3” means the third line from the bottom of the page; “Eq. 2.30, +2” means the second line following Eq. 2.30; Eq. 6.48, line 1 means the first line in Eq. 6.48.

| Page | Line, Fig., ... | Error | Correction | | |
|--------|--------------------------------|---|---|---|--|
| 10 | Eq. 1.6 | correct to: | | | |
| | | $(r^2 + l^2 + s^2 - d^2) - 2rl\cos\phi - 2lscos\theta_1 + 2rscos(\phi + \theta_1) = 0$ | | | |
| | Eq. 1.7 | correct to: | | | |
| | | $(r^2 + l^2 - s^2 - d^2) - 2rl\cos\phi + 2dscos\theta_2 = 0$ | | | |
| 11, 12 | Figs. 1.12, 1.13, 1.14 | <u>The link lengths are:</u> | crank = r , coupler = d , follower = s , frame = l | | |
| 12 | Eq. 1.12, 4 th line | $\dots - \frac{d}{2} \sin\phi_2 = 0$ | $\dots + \frac{d}{2} \sin\phi_2 = 0$ | | |
| 23 | Eq. 2.30, +3 | $a_{ij} = 0$ | $a_{ii} = 0$ | | |
| | Eq. 2.33, +1 | correct to: where I is a 3 x 3 identity matrix. The ... | | | |
| 25 | Eq. 2.42 | 0 | 0 | | |
| 28 | Eq. 2.61 | $\dot{\alpha} \dot{a}$ | $\dot{\alpha} a$ | | |
| 29 | line 2 | $\dots = \mathbf{c}$ | $\dots = c$ | | |
| 30 | Ex. 2.5, +4 | $6x_2x_4^2$ | $6x_2x_4$ | | |
| 32 | Eq. 2.75, -2 | n-vector | 3-vector | | |
| | Eq. 2.75, +1 | n x m matrix | 3 x m matrix | | |
| 34 | Prob. 2.16 | make the following corrections: | | | |
| | | $\mathbf{A}_i = \begin{bmatrix} \cos\phi_i & -\sin\phi_i & 0 \\ \sin\phi_i & \cos\phi_i & 0 \\ 0 & 0 & 1 \end{bmatrix}$ | $\mathbf{c}_1 = \begin{bmatrix} 1.2 \\ -0.5 \\ 0 \end{bmatrix}$ | $\mathbf{c}_2 = \begin{bmatrix} -0.3 \\ 0.8 \\ 0 \end{bmatrix}$ | $\mathbf{d} = \begin{bmatrix} x_2 - x_1 \\ y_2 - y_1 \\ 0 \end{bmatrix}$ |
| 42 | Eq. 3.4, +5 | $m = 4 \times 3 = 12$ | $m = 6 \times 2 = 12$ | | |
| 45 | Fig. 3.9 | $l_3 = 3 \text{ m}$ | $l_3 = 0.3 \text{ m}$ | | |
| | Eq. a | v^i | \mathbf{v}^i | | |
| | footnote, line 1 | $[\mathbf{u}^{i^t}, \mathbf{v}^{i^t}]$ | $[\mathbf{u}^{i^T}, \mathbf{v}^{i^T}]$ | | |
| 48 | line -3 | $\ddot{\phi}_3 = 5.39$ | $\ddot{\phi}_3 = -5.39$ | | |
| 49 | Eq. 3.15, 1 st | $(\dots)_{\dot{\mathbf{q}}}$ | $(\dots)\dot{\mathbf{q}}$ | | |
| | Eq. 3.15, 2 nd | $(\dots) + (\dots)_{\mathbf{q}}\dot{\mathbf{q}} + \dots$ | $(\dots) + (\dots)_{\mathbf{q}}\dot{\mathbf{q}} + \dots$ | | |
| 60 | last equation | $\begin{bmatrix} 1 \\ 3.5 \\ -7 \\ 17 \end{bmatrix}$ | $\begin{bmatrix} 1 \\ 3.5 \\ -7 \\ -17 \end{bmatrix}$ | | |

| | | | |
|-----|----------------------------------|---|--|
| 67 | Fig. 3.11 | infection | inflection |
| 69 | Ex. 3.13, +2 | Φ_2 | ϕ_2 |
| | Ex. 3.13, +2 | Φ_1 | ϕ_1 |
| | Ex. 3.13, +7 | $[\Phi_2, d]^T$ | $[\phi_2, d]^T$ |
| | Ex. 3.13, +8 | $[\Phi_1]$ | $[\phi_1]$ |
| | Eq. 5 | $\begin{bmatrix} \Phi_1 \\ -\Phi_2 \end{bmatrix}$ | $\begin{bmatrix} -\Phi_1 \\ -\Phi_2 \end{bmatrix}$ |
| 70 | line 11 | <u>move the thick line from before the table to below the table</u> | |
| | 2 nd row in the table | 326° | 320° |
| 103 | line 2 | \mathbf{r}_i'' | $\ddot{\mathbf{r}}_i$ |
| | line 3 | \mathbf{r}_i'' | $\ddot{\mathbf{r}}_i$ |
| | line -7, circled 2 | $-\xi_i^P \sin\phi_i + \eta_i^P \cos\phi_i$ | $-\xi_i^P \sin\phi_i - \eta_i^P \cos\phi_i$ |
| 109 | Eq. f, line 3 | $\Phi_3 \equiv \Phi_1 = 0$ | $\Phi_3 \equiv \phi_1 = 0$ |
| 110 | line 5 | $(y_1 - 100 \sin\phi_1 - y_4)$ | $(y_1 - y_4)$ |
| | | $(x_1 - 100 \cos\phi_1 - x_4)$ | $(x_1 - x_4)$ |
| | line 22, circled 30 | <u>replace the statement for circled 30 with:</u> | |
| | line 25, circled 33 | circled 7, circled 11, circled 21, circled 25, circled 30 = 0 | |
| | | $(y_1 - 100 \sin\phi_1 - y_4)$ | $(y_1 - y_4)$ |
| | | $(x_1 - 100 \cos\phi_1 - x_4)$ | $(x_1 - x_4)$ |
| 114 | before last parag. | <u>redundant data (it could be removed)</u> | |
| 127 | Sub. INPOIN , +6 | centroid | origin |
| 133 | Sub. SMPL , +4 | NG>0 and NS>0 | NG>0 or NS>0 |
| 141 | top line | Program Expansion | Problems |
| 143 | top line | Program Expansion | Problems |
| 145 | top line | Program Expansion | Problems |
| 147 | top line | Program Expansion | Problems |
| 149 | top line | Program Expansion | Problems |
| 151 | top line | Program Expansion | Problems |
| 154 | Fig. 6.2 | "z" is missing on the axis | |
| 155 | line 11 | $(\bar{u})_{(z)}$ | $\bar{u}_{(z)}$ |
| 158 | Fig. 6.4 | <u>replace with the following figure</u> | |



| | | | |
|-----|----------|-------|----------------|
| 160 | Eq. 6.22 | e^T | \mathbf{e}^T |
|-----|----------|-------|----------------|

| | | | |
|-----|------------------------|---|---|
| 165 | -7 | $\mathbf{u}_\zeta = \dots = \begin{bmatrix} -0.922 \\ -0.293 \\ 0.387 \end{bmatrix}$ | $\mathbf{u}_\zeta = \dots = \begin{bmatrix} -0.922 \\ -0.029 \\ 0.387 \end{bmatrix}$ |
| | -5 | $\mathbf{A} = \begin{bmatrix} \dots & \dots & \dots \\ \dots & \dots & -0.293 \\ \dots & \dots & \dots \end{bmatrix}$ | $\mathbf{A} = \begin{bmatrix} \dots & \dots & \dots \\ \dots & \dots & -0.029 \\ \dots & \dots & \dots \end{bmatrix}$ |
| | -4 | $\mathbf{p} = [0.810, -0.029, -0.543, 0.191]^T$ | $\mathbf{p} = [0.810, -0.1103, -0.543, 0.191]^T$ |
| 168 | Eq. 6.48, line 1 | $\begin{bmatrix} -\mathbf{e}^T \\ \mathbf{e} + e_0 \mathbf{I} \end{bmatrix}$ | $\begin{bmatrix} -\mathbf{e}^T \\ \tilde{\mathbf{e}} + e_0 \mathbf{I} \end{bmatrix}$ |
| 171 | Eq. b | $\dot{\mathbf{p}}$ | $\dot{\tilde{\mathbf{p}}}$ |
| | line 4 | $\dots = \dot{\mathbf{a}} \mathbf{p}$ | $\dots = \dot{\mathbf{a}} \tilde{\mathbf{p}}$ |
| 174 | footnote, +2 | $(\mathbf{s})'^P$ | $(\tilde{\mathbf{s}})'^P$ |
| 175 | Eq. 6.109, +1 | $\dots + 2\dot{\mathbf{G}}\mathbf{p}$ | $\dots + 2\dot{\tilde{\mathbf{G}}}\tilde{\mathbf{p}}$ |
| 176 | last equation | \mathbf{S}^* | $\tilde{\mathbf{s}}^*$ |
| 178 | Eq. 6.118, line 1 | $\begin{bmatrix} e_{0j} \\ \mathbf{e}_j \end{bmatrix}$ | $\begin{bmatrix} e_{0j} \\ \mathbf{e}_j \end{bmatrix}$ |
| 181 | PROBLEMS, -2 | missing Eq. # | $\boldsymbol{\omega}_j = \boldsymbol{\omega}_i + \boldsymbol{\omega}_{ji} \quad (6.128)$ |
| 201 | Eq. 5, +1 | ... Eqs. 6.73, 6.54, ... | ... Eqs. 6.73, 6.55, ... |
| 202 | Ex. 7.3, last equation | $\dots \dot{\mathbf{G}}_i \mathbf{L}_i \dots$ | $\dots \dot{\tilde{\mathbf{G}}}_i \tilde{\mathbf{L}}_i^T \dots$ (correct twice) |
| 203 | TABLE 7.2 | | |
| | col. 3, row 5 | \mathbf{s}'_i | $\tilde{\mathbf{s}}'_i$ |
| | col. 5, row 3 | $\mathbf{s}'_j{}^B$ | $\tilde{\mathbf{s}}'_j{}^B$ |
| | col. 6, row 3 | $-\mathbf{s}'_i{}^T (\mathbf{h}_i^B - \mathbf{h}_j^B) \dots$ | $\tilde{\mathbf{s}}'_i{}^T (\mathbf{h}_j^B - \mathbf{h}_i^B) \dots$ |
| | col. 6, row 5 | $-\tilde{\mathbf{s}}'_i (\mathbf{h}_j^B - \mathbf{h}_i^B) \dots$ | $\tilde{\mathbf{s}}'_i (\mathbf{h}_j^B - \mathbf{h}_i^B) \dots$ |
| | col. 6, row 7 | $2\mathbf{d}^T (\mathbf{h}_j^P - \mathbf{h}_i^P) \dots$ | $2\mathbf{d}^T (\mathbf{h}_j^P - \mathbf{h}_i^P) \dots$ |
| 206 | top figure | missing caption | Figure P.7.19 |
| 209 | Eq. (a), -1 | body i | particle i |
| 210 | Fig. 8.2 | \mathbf{f}_p | $\tilde{\mathbf{f}}_p$ |
| 213 | line 4 | $\mathbf{n}^O = \dots$ | $\tilde{\mathbf{n}}^O = \dots$ |
| | line -6 | $\mathbf{n} = \tilde{\mathbf{s}}^A \mathbf{f} + \tilde{\mathbf{s}}^B (-f)$ | $\tilde{\mathbf{n}} = \tilde{\mathbf{s}}^A \mathbf{f} + \tilde{\mathbf{s}}^B (-f)$ |
| 216 | Eq. i | $\tilde{\mathbf{r}}_j^P$ | $\tilde{\tilde{\mathbf{r}}}_j^P$ |
| 219 | Eq. 8.27, line 3 | subscript (v) for the integral is missing | |
| 223 | parag. 2, +6 | $\mathbf{h}_i = [\tilde{\mathbf{r}}^T, \boldsymbol{\omega}'^T]_i^T$ | $\tilde{\mathbf{h}}_i = [\tilde{\tilde{\mathbf{r}}^T}, \boldsymbol{\omega}'^T]_i^T$ |
| 229 | line -5 | $\mathbf{s}^P = \mathbf{A}_i \mathbf{s}'_i{}^P$ | $\tilde{\mathbf{s}}^P = \mathbf{A}_i \tilde{\mathbf{s}}'_i{}^P$ |
| 250 | Prob. 9.7 (c) | ... 0.05, determine ... | ... 0.05 (other velocities are zero), determine ... |
| | Prob. 9.7 | add the following: | |
| | Prob. 9.8 (d) | (e) Find the accelerations in this configuration. add to the end: (let $\dot{x}_1 = \dot{y}_1 = \dot{y}_2 = 0$) | |

| | | | |
|-----|---|--|--|
| 256 | line 20 | <u>correct to:</u> C.....N must be greater than or equal to M | |
| 257 | M10, Length | N | N + M |
| | M10, Description | ... Φ_q | ... $\begin{bmatrix} \mathbf{M} & \Phi_q^T \\ \Phi_q & \mathbf{0} \end{bmatrix}$ |
| 260 | line 9 | ..., ETA, P-J'... | ..., ETA-P-J'... |
| | Sub. TRANSF | ..., Sec. 5.1.1 | ..., Sec. 5.1.2 |
| 262 | Following Sub. TRIG, before Sub. MASS ... | <u>missing statement for Sub. MASS (add the following:)</u> | |

Subroutine MASS. This subroutine generates the square matrix to the left of Eq. 10.5 containing the mass and the moment of inertia for each body, the Jacobian matrix and its transpose.

Subroutine MASS is as follows:

| | | | |
|-----|------------------------|---|--|
| 263 | Sub. FUNCT | Sec. 5.2.3 | Sec. 5.1.3 |
| | Sub. RVLT | Sec. 5.2.3 | Sec. 5.1.3 |
| | Sub. TRAN | Sec. 5.2.3 | Sec. 5.1.3 |
| | Sub. SMPL | Sec. 5.2.3 | Sec. 5.1.3 |
| 269 | line 6 data | 1,2,0,-1,0 | 1,2,0,0,-1,0 |
| 275 | line 14 | 2,3,-.38 | 2,3,-.38,0,0 |
| 276 | line -3 | 3.669.2 | 3669.2 |
| 284 | Prob. 10.24, line 3 | <u>..., as can that ...</u> | <u>..., as that ...</u> |
| 286 | last line | axial | radial |
| 289 | line -7 | \mathbf{n} | \mathbf{n}'_i |
| | line -5 | $\bar{\mathbf{n}}_i$ | \mathbf{n}'_i |
| 290 | Eq. (b) line 1 | $\frac{\delta(\mathbf{A}_i \mathbf{s}'_i)}{\delta \mathbf{p}_i}$ | $\frac{\partial(\mathbf{A}_i \mathbf{s}'_i)}{\partial \mathbf{p}_i}$ |
| | line -5 | $\mathbf{p}_i^T \mathbf{p}_i^{-1} = 0$ | $\mathbf{p}_i^T \mathbf{p}_i - 1 = 0$ |
| 296 | Eq. 11.40 | $\tilde{\omega}'_1 \mathbf{J}'_1 \omega'_i$ | $\tilde{\omega}'_1 \mathbf{J}'_1 \omega'_i$ |
| 299 | Eq. 3 | ... + $(\tilde{\mathbf{s}}_j^T \mathbf{A}_i \tilde{\mathbf{s}}'_i - \mathbf{s}_j^T \dot{\mathbf{A}}_i \tilde{\mathbf{s}}'_i) \omega'_i + \dots$ | ... + $(-\tilde{\mathbf{s}}_j^T \mathbf{A}_i \tilde{\mathbf{s}}'_i - \mathbf{s}_j^T \dot{\mathbf{A}}_i \tilde{\mathbf{s}}'_i) \omega'_i + \dots$ |
| | following Eq. 4 | <u>a thick line is needed</u> | |
| | parag. following Eq. 4 | <u>the paragraph should not be indented</u> | |
| | TABLE 11.1 | | |
| | col. 6, row 6 | $-2\dot{\mathbf{d}}^T \dot{\mathbf{d}} + \dots$ | $-2\dot{\mathbf{d}}^T \dot{\mathbf{d}} + \dots$ |
| | following Table 11.1 | <u>remove the thick line</u> | |
| | Prob. 11.3 | Eq. 11.6 | Eq. 11.16 |
| 300 | Fig. P.11.7 | <u>the vecor for n_2 should be a thick line</u> | |
| 302 | Eq. 12.5 | $\epsilon^i = y(t^i) - y^i $ | $\epsilon^i = y(t^i) - y^i $ |
| 311 | Eq. 12.24 | $\Delta \mathbf{y}^{i+1} = \left(\mathbf{I} - b_{-1} \frac{\dots}{\dots} \right)^{-1} \dots$ | $\Delta \mathbf{y}^{i+1} = - \left(\mathbf{I} - h b_{-1} \frac{\dots}{\dots} \right)^{-1} \dots$ |
| 314 | line before footnote | ... time t^o to a final ... | ... time t^0 to a final ... |
| 316 | line 7 | Method 1. | Method I. |
| 333 | parag. 3, +3 | ... the for of ... | ... the form of ... |
| 334 | line (a.3) | $\ddot{\theta}$ | $\dot{\theta}$ |

| | | | |
|-----|---------------|---------------------------|---------------------------|
| 352 | Eq. A.7 | $\cos \phi_1 \cos \phi_3$ | $\cos \phi_2 \cos \phi_3$ |
| 357 | Ref. 15 | Wehave | Wehage |
| 368 | Sparse matrix | 100, 144 | 110, 144 |