Nacelle:

The rigid lump mass of the nacelle brings about generalized inertia forces and generalized active forces associated with nacelle weight.

$$F_r^*\big|_N = {}^E\boldsymbol{v}_r^U \cdot \left(-m^N\,{}^E\boldsymbol{a}^U\right) + {}^E\boldsymbol{\omega}_r^N \cdot \left(-{}^E\dot{\boldsymbol{H}}^N\right) \quad (r = 1,2,\ldots,22) \qquad \text{where} \qquad m^N = NacMass$$

Thus,

$$F_r^*\big|_N = {}^E\boldsymbol{v}_r^U \cdot \left(-m^N\,{}^E\boldsymbol{a}^U\right) + {}^E\boldsymbol{\omega}_r^N \cdot \left(-\bar{\bar{\boldsymbol{I}}}^N \cdot {}^E\boldsymbol{\alpha}^N - {}^E\boldsymbol{\omega}^N \times \bar{\bar{\boldsymbol{I}}}^N \cdot {}^E\boldsymbol{\omega}^N\right) \quad (r = 1,2,\ldots,22)$$

where $\bar{\bar{\boldsymbol{I}}}^N = \left[NacYIner - m^N\left(NacCMxn^2 + NacCMyn^2\right)\right]\boldsymbol{d}_2\boldsymbol{d}_2$

Or,

$$F_r^*\big|_N = {}^E\boldsymbol{v}_r^U \cdot \left(-m^N\left\{\left(\sum_{i=1}^{11} {}^E\boldsymbol{v}_i^U \ddot{q}_i\right) + \left[\sum_{i=4}^{11} \frac{d}{dt}\left({}^E\boldsymbol{v}_i^U\right)\dot{q}_i\right]\right\}\right) + {}^E\boldsymbol{\omega}_r^N \cdot \left(-\bar{\bar{\boldsymbol{I}}}^N \cdot \left\{\left(\sum_{i=4}^{11} {}^E\boldsymbol{\omega}_i^N \ddot{q}_i\right) + \left[\sum_{i=7}^{11} \frac{d}{dt}\left({}^E\boldsymbol{\omega}_i^N\right)\dot{q}_i\right]\right\} - {}^E\boldsymbol{\omega}^N \times \bar{\bar{\boldsymbol{I}}}^N \cdot {}^E\boldsymbol{\omega}^N\right) \quad (r = 1,2,\ldots,11)$$

Thus,

$$\left[C(q,t)\right]\big|_N (Row,Col) = m^N\,{}^E\boldsymbol{v}_{Row}^U \cdot {}^E\boldsymbol{v}_{Col}^U + {}^E\boldsymbol{\omega}_{Row}^N \cdot \bar{\bar{\boldsymbol{I}}}^N \cdot {}^E\boldsymbol{\omega}_{Col}^N \quad (Row,Col = 1,2,\ldots,11)$$

$$\left\{-f(\dot{q},q,t)\right\}\big|_N (Row) = -m^N\,{}^E\boldsymbol{v}_{Row}^U \cdot \left[\sum_{i=4}^{11} \frac{d}{dt}\left({}^E\boldsymbol{v}_i^U\right)\dot{q}_i\right] - {}^E\boldsymbol{\omega}_{Row}^N \cdot \left\{\bar{\bar{\boldsymbol{I}}}^N \cdot \left[\sum_{i=7}^{11} \frac{d}{dt}\left({}^E\boldsymbol{\omega}_i^N\right)\dot{q}_i\right] + {}^E\boldsymbol{\omega}^N \times \bar{\bar{\boldsymbol{I}}}^N \cdot {}^E\boldsymbol{\omega}^N\right\} \quad (Row = 1,2,\ldots,11)$$

$$F_r\big|_{GravN} = {}^E\boldsymbol{v}_r^U \cdot \left(-m^N g\boldsymbol{z}_2\right) \quad (r = 3,4,\ldots,11)$$

Thus,

$$\left[C(q,t)\right]\big|_{GravN} = 0$$

$$\left\{-f(\dot{q},q,t)\right\}\big|_{GravN} (Row) = -m^N g\,{}^E\boldsymbol{v}_{Row}^U \cdot \boldsymbol{z}_2 \quad (Row = 3,4,\ldots,11)$$