$$\text{minimize: } \boldsymbol{x}^{\mathrm{T}}\boldsymbol{W}\boldsymbol{x}/2 + \boldsymbol{q}^{\mathrm{T}}\boldsymbol{x} \tag{1}$$
$$\text{subject to: } \boldsymbol{A}\boldsymbol{x} = \boldsymbol{b} \tag{2}$$
$$\boldsymbol{C}\boldsymbol{x} \leqslant \boldsymbol{d} \tag{3}$$

$$\text{minimize: } \boldsymbol{x}^{\mathrm{T}}\boldsymbol{W}\boldsymbol{x}/2 + \boldsymbol{q}^{\mathrm{T}}\boldsymbol{x} \tag{4}$$
$$\text{subject to: } \boldsymbol{A}\boldsymbol{x} = \boldsymbol{b} \tag{5}$$
$$\max{}^3\{\boldsymbol{0}, \boldsymbol{C}\boldsymbol{x} - \boldsymbol{d}\} \tag{6}$$

$$\begin{cases} \boldsymbol{W}\boldsymbol{x} + \boldsymbol{A}^{\mathrm{T}}\boldsymbol{\lambda} + \boldsymbol{C}^{\mathrm{T}}\boldsymbol{\mu} = \boldsymbol{0} & (7) \\ \boldsymbol{A}\boldsymbol{x} - \boldsymbol{b} = \boldsymbol{0} & (8) \\ \boldsymbol{\mu}^{\mathrm{T}}(\boldsymbol{d} - \boldsymbol{C}\boldsymbol{x}) = \boldsymbol{0},\ \boldsymbol{\mu} \geqslant \boldsymbol{0},\ \boldsymbol{d} - \boldsymbol{C}\boldsymbol{x} \geqslant \boldsymbol{0} & (9) \end{cases}$$

$$\mathcal{L} = \boldsymbol{x}^{\mathrm{T}}\boldsymbol{W}\boldsymbol{x}/2 + \boldsymbol{q}^{\mathrm{T}}\boldsymbol{x} + \boldsymbol{\lambda}^{\mathrm{T}}(\boldsymbol{A}\boldsymbol{x} - \boldsymbol{b}) \tag{10}$$
$$+ \boldsymbol{\mu}^{\mathrm{T}}\max{}^3\{\boldsymbol{0}, \boldsymbol{C}\boldsymbol{x} - \boldsymbol{d}\} \tag{11}$$

$$\begin{cases} \boldsymbol{W}\boldsymbol{x} + \boldsymbol{q} + \boldsymbol{A}^{\mathrm{T}}\boldsymbol{\lambda} + 3\boldsymbol{C}^{\mathrm{T}}(\max{}^2\{\boldsymbol{0}, \boldsymbol{C}\boldsymbol{x} - \boldsymbol{d}\} \circ \boldsymbol{\mu}) & (12) \\ \boldsymbol{A}\boldsymbol{x} - \boldsymbol{b} & (13) \\ \max{}^3\{\boldsymbol{0}, \boldsymbol{C}\boldsymbol{x} - \boldsymbol{d}\} & (14) \end{cases}$$

$\boldsymbol{\eta} := \max\{\boldsymbol{0}, \boldsymbol{C}\boldsymbol{x} - \boldsymbol{d}\},\ \boldsymbol{D}_1 := \mathrm{diag}\{\boldsymbol{\mu}\},\ \boldsymbol{D}_2 := \mathrm{diag}\{\boldsymbol{\eta}\}$

$$\begin{cases} \boldsymbol{W}\boldsymbol{x} + \boldsymbol{q} + \boldsymbol{A}^{\mathrm{T}}\boldsymbol{\lambda} + 3\boldsymbol{C}^{\mathrm{T}}\boldsymbol{D}_2\boldsymbol{D}_2\boldsymbol{\mu} & (15) \\ \boldsymbol{A}\boldsymbol{x} - \boldsymbol{b} & (16) \\ \boldsymbol{D}_2\boldsymbol{D}_2\boldsymbol{\eta} & (17) \end{cases}$$

$$\dot{\boldsymbol{W}}\boldsymbol{x} + \boldsymbol{W}\dot{\boldsymbol{x}} + \dot{\boldsymbol{q}} + \dot{\boldsymbol{A}}^{\mathrm{T}}\boldsymbol{\lambda} + \boldsymbol{A}^{\mathrm{T}}\dot{\boldsymbol{\lambda}} + 3\dot{\boldsymbol{C}}^{\mathrm{T}}\boldsymbol{D}_2\boldsymbol{D}_2\boldsymbol{\mu} \tag{18}$$
$$+3\boldsymbol{C}^{\mathrm{T}}\boldsymbol{D}_2\boldsymbol{D}_2\dot{\boldsymbol{\mu}} + 6\boldsymbol{C}^{\mathrm{T}}\boldsymbol{D}_1\boldsymbol{D}_2(\dot{\boldsymbol{C}}\boldsymbol{x} + \boldsymbol{C}\dot{\boldsymbol{x}} - \dot{\boldsymbol{d}}) \tag{19}$$

$$\dot{\boldsymbol{A}}\boldsymbol{x} + \boldsymbol{A}\dot{\boldsymbol{x}} - \dot{\boldsymbol{b}} \tag{20}$$

$$3\boldsymbol{D}_2\boldsymbol{D}_2(\dot{\boldsymbol{C}}\boldsymbol{x} + \boldsymbol{C}\dot{\boldsymbol{x}} - \dot{\boldsymbol{d}}) \tag{21}$$

$$\boldsymbol{M} = \begin{bmatrix} \boldsymbol{W} + 6\boldsymbol{C}^{\mathrm{T}}\boldsymbol{D}_1\boldsymbol{D}_2\boldsymbol{C} & \boldsymbol{A}^{\mathrm{T}} & 3\boldsymbol{C}^{\mathrm{T}}\boldsymbol{D}_2\boldsymbol{D}_2 \\ \boldsymbol{A} & \boldsymbol{0} & \boldsymbol{0} \\ 3\boldsymbol{D}_2\boldsymbol{D}_2\boldsymbol{C} & \boldsymbol{0} & \boldsymbol{0} \end{bmatrix}, \tag{22}$$

$$\boldsymbol{P} = \begin{bmatrix} \dot{\boldsymbol{W}} + 6\boldsymbol{C}^{\mathrm{T}}\boldsymbol{D}_1\boldsymbol{D}_2\dot{\boldsymbol{C}} & \dot{\boldsymbol{A}}^{\mathrm{T}} & 3\dot{\boldsymbol{C}}^{\mathrm{T}}\boldsymbol{D}_2\boldsymbol{D}_2 \\ \dot{\boldsymbol{A}} & \boldsymbol{0} & \boldsymbol{0} \\ 3\boldsymbol{D}_2\boldsymbol{D}_2\dot{\boldsymbol{C}} & \boldsymbol{0} & \boldsymbol{0} \end{bmatrix}, \tag{23}$$

$$\boldsymbol{v} = \begin{bmatrix} \dot{\boldsymbol{q}} - 6\boldsymbol{C}^{\mathrm{T}}\boldsymbol{D}_1\boldsymbol{D}_2\dot{\boldsymbol{d}} \\ -\dot{\boldsymbol{b}} \\ -3\boldsymbol{D}_2\boldsymbol{D}_2\dot{\boldsymbol{d}} \end{bmatrix}, \tag{24}$$