In general, the constraints on the administration rate u and the concentrations c can be of the form:

$$G \cdot c_k + H u_k \leq M; \ \forall k \in \mathbb{N}_{[0,N]}$$

where $G \in \mathbb{R}^{n_c \times n}$, $H \in \mathbb{R}^{n_c \times m}$ and $M \in \mathbb{R}^{n_c}$.

For the composite variable

$$z = (u_0, c_1, u_1, c_2, \ldots, c_{N-1}, u_{N-1}, c_N)'$$

the constraints are written as:

$$\Phi z \leq \phi$$

where:

$$\Phi = \begin{bmatrix} H & 0 & & \\ G & H & & \\ & G & H & \\ & & & \ddots \end{bmatrix} \text{ and } \phi = \begin{bmatrix} M - G c_0 \\ M \\ \vdots \\ M \end{bmatrix}$$

with $\Phi \in \mathbb{R}^{(n_c \cdot N) \times N(n+m)}$ and $\phi \in \mathbb{R}^{N n_c}$.

Constraints may not be imposed on all concentrations but only on some c^j for $j \in J$ where $J = \{j_1, j_2, \ldots, j_k\}$ with $k \leq n$. Let

$$\Delta_J = \begin{bmatrix} e(j_1)' \\ e(j_2)' \\ \vdots \\ e(j_k)' \end{bmatrix}$$

where $e(j)$ is a vector of $\mathbb{R}^n$ whose j-th entry is 1 and all other entries are 0. The constraints on c are written as:

$$\begin{cases} \Delta_J \cdot c_k \leq c^J_{max} \\ 0 \leq c_k \end{cases} ; \ \forall k \in \mathbb{N}_{[0,N]}$$

and in terms of z they become:

$$\begin{bmatrix} I_m & & & & & \\ & \Delta_{\mathcal{J}} & & & & \\ & & I_m & & & \\ & & & \ddots & & \\ & & & & I_m & \\ & & & & & \Delta_{\mathcal{J}} \end{bmatrix} \cdot z \leq \begin{bmatrix} U_{max} \\ C_{max}^{\mathcal{J}} \\ U_{max} \\ C_{max}^{\mathcal{J}} \\ \vdots \\ U_{max} \\ C_{max}^{\mathcal{J}} \end{bmatrix}$$

$C_{max}^{\mathcal{J}}$ refers to the constraints (bounds) imposed on C^j with $j \in \mathcal{J}$, i.e., if

$$C_{max}^{\mathcal{J}} = \begin{bmatrix} C_{max}^{\mathcal{J}}(1) \\ C_{max}^{\mathcal{J}}(2) \\ \vdots \\ C_{max}^{\mathcal{J}}(k) \end{bmatrix}$$

Then:
$$C^{j_1} \leq C_{max}^{\mathcal{J}}(1)$$
$$\vdots$$
$$C^{j_k} \leq C_{max}^{\mathcal{J}}(k).$$