Langrangian function

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$$\mathcal{L}(\underline{x}, \underline{\lambda}, \underline{\nu}) = \sum_m \sum_t c_1^{gen} \times q_{1,m,t} +$$

$$\sum_{e'} \sum_m \sum_t c_{e'}^{gen} \times q_{e',m,t} +$$

$$\sum_{e'} \sum_t c_{e'}^{main} \times \bar{q}_{e',t} +$$

$$\sum_t c^{stock} \times q_t^{stock,stored} +$$

$$\sum_e \sum_t \lambda_{e,t}^1 \times \left\{ q_{e,M1,t}^{del} + q_{e,M2,t}^{arb} - q_{e,M1,t} \right\} +$$

$$\sum_e \sum_t \lambda_{e,t}^2 \times \left\{ q_{e,M2,t}^{del} + q_{e,M1,t}^{arb} - q_{e,M2,t} \right\} +$$

$$\sum_t \lambda_t^3 \times \left\{ \left[\sum_e q_{e,M1,t}^{del} \right] + \left[\sum_e q_{e,M2,t}^{arb} \right] + q_t^{stock,in/out} - d_{M1,t} \right\} +$$

$$\sum_t \lambda_4^t \times \left\{ \left[\sum_e q_{e,M2,t}^{del} \right] + \left[\sum_e q_{e,M1,t}^{arb} \right] - d_{M2,t} \right\} +$$

$$\sum_e \sum_t \nu_{e,t}^1 \times \left\{ q_{e,M1,t}^{del} + q_{e,M2,t}^{arb} - 2 \times d_{M1,t} \right\} +$$

$$\nu^2 \times \left\{ q_{t\_start}^{Stock,stored} \right\} +$$

$$\sum_{t'} \lambda_{t'}^5 \times \left\{ q_{t'}^{Stock,stored} - q_{t'-1}^{stock,stored} + q_{t'-1}^{stock,in/out} \right\} +$$

$$\sum_e \nu_e^3 \times \left\{ \left[\sum_m \sum_t q_{e,m,t} \right] - Q_e \right\} +$$

$$\sum_{e'} \sum_t \nu_{e',t}^4 \times \left\{ \left[\sum_m q_{e',m,t} \right] - \bar{q}_{e',t} \right\} +$$

$$\sum_t \nu_t^5 \times \left\{ \left[\sum_m q_{1,m,t} \right] - \bar{q}_{1,t} \right\} +$$

$$\sum_{e'} \sum_t \lambda_{e',t}^6 \times \left\{ q_{e',t}^{diff} - \bar{q}_{e',t} + \left[\sum_m q_{e',m,t} \right] \right\} +$$

$$\sum \sum \nu^6 \times \{ q^{add}$$

$$\sum_{e'}\sum_{t''} \mu^{6}_{e',t''} \times \left\{ q^{add}_{e',t''} - \beta^{add} \times \left[\bar{q}_{e',t''} - q^{diff}_{e',t''} \right] \right\} +$$

$$\sum_{e'}\sum_{t'} \lambda^{7}_{e',t'} \times \left\{ \bar{q}_{e',t'} - \bar{q}_{e',t'-1} - q^{add}_{e',t'-1} + q^{retire}_{e',t'-1} \right\} +$$

$$\lambda^{8} \times \left\{ q^{stock,stored}_{t\_end} - q^{stock,inout}_{t\_end} \right\} +$$

$$\sum_{e'} \lambda^{9}_{e'} \times \left\{ \bar{q}_{e',t\_start} - \bar{q}^{init}_{e'} \right\} +$$

$$\sum_{e'}\sum_{t''} \mu^{7}_{e',t''} \times \left\{ q^{retire}_{e',t''} - \beta^{retire} \times \bar{q}^{init}_{e'} \right\} +$$

$$\sum_{e}\sum_{m}\sum_{t} \mu^{8}_{e,m,t} \times \left\{ -q_{e,m,t} \right\} +$$

$$\sum_{e'}\sum_{t} \mu^{9}_{e',t} \times \left\{ -\bar{q}_{e',t} \right\} +$$

$$\sum_{t} \mu^{10}_{t} \times \left\{ -q^{stock,stored}_{t} \right\} +$$

$$\sum_{e}\sum_{m}\sum_{t} \mu^{11}_{e,m,t} \times \left\{ -q^{del}_{e,m,t} \right\} +$$

$$\sum_{e}\sum_{m}\sum_{t} \mu^{12} \times \left\{ -q^{arb}_{e,m,t} \right\} +$$

$$\sum_{e'}\sum_{t} \mu^{13}_{e',t} \times \left\{ -q^{diff}_{e',t} \right\} +$$

$$\sum_{e'}\sum_{t''} \mu^{14}_{e',t''} \times \left\{ -q^{add}_{e',t''} \right\} +$$

$$\sum_{e'}\sum_{t''} \mu^{15}_{e',t''} \times \left\{ -q^{retire}_{e',t''} \right\}$$