Hybrid Transported-Tabulated Chemistry (HTTC) [1]

MODELING STRATEGY: All the species which are non-zero in fresh and burnt gases are transported, and the intermediate radicals are expressed from self-similar responses.

Let us consider a mixture that involves a set A of q distinct chemical species j, interacting in a detailed chemical scheme according to N elementary reactions:

$$\sum_{j\in\mathcal{A}} \mu^{f}_{j,n} j \leftrightarrow \sum_{j\in\mathcal{A}} \mu^{b}_{j,n} j$$

$\mu^{f}_{j,n}$ (resp. $\mu^{b}_{j,n}$) is the forward (resp. backward) stoichiometric coefficient of the n^{th} reaction rate.

Reaction rate of *j*-species: $$\dot{\omega}_j = W_j \sum_{n=1}^{N} \left(\mu^{b}_{j,n} - \mu^{f}_{j,n}\right) \dot{\omega}_n$$

***n*^th reaction rate:** $$\dot{\omega}_n = \prod_{j\in\mathcal{A}} \left(\frac{\rho Y_j}{W_j}\right)^{\mu_{j,n}} A_n T^{\nu_n} \exp\left(-T_{A,n}/T\right)$$

How is obtained Y_j?

- ***Transported species:*** Y_j
- ***Tabulated species:*** $Y_j = Y_j^{\max}(\phi) \times Y_j^{+}(Y_{c,j}^{+}(\phi))$

APPLICATION:

1. The whole kinetic mechanism is loaded

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25. CH+H2O = CH2O+H
26. CH+CH2O = CH2CO+H
27. CH+CH2 = C2H2+H
28. CH+CH3 = C2H3+H
29. CH+CH4 = C2H4+H
30. HCO+H = CO+H2
31. HCO+O = CO+OH
...

2. Identification of transported species.

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3. Mass fraction of tabulated species: S2FT

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