SIMPLE CONSISTENT (SIMPLEC) ALGORITHM

OVERALL APPROACH

- **SIMPLE**: most significant assumption made is the omission of the terms \( \sum a_{nb}u'_{nb} \) and \( \sum a_{nb}v'_{nb} \) when developing equations for the velocity corrections:

\[
\begin{align*}
    u'_{i,j} &= \frac{A_{i,j}}{a_{i,j}} (p'_{i-1,j} - p'_{i,j}) + \frac{\sum a_{nb}u'_{nb}}{a_{i,j}} \quad \text{(omitted)} \\
    v'_{i,j} &= \frac{A_{i,j}}{a_{i,j}} (p'_{i,j-1} - p'_{i,j}) + \frac{\sum a_{nb}v'_{nb}}{a_{i,j}} \quad \text{(omitted)}
\end{align*}
\]

(1)

- **SIMPLEC**: in this algorithm, these terms are not omitted but are approximated.

SIMPLEC APPROXIMATION

\[
\begin{align*}
    \sum a_{nb}u'_{nb} & \approx u'_{i,j} \sum a_{nb} \\
    \sum a_{nb}v'_{nb} & \approx v'_{i,j} \sum a_{nb}
\end{align*}
\]

(2)

Therefore, the x-velocity correction term (1) can be rewritten:

\[
\sum a_{nb}u'_{nb} \approx u'_{i,j} \sum a_{nb}
\]

(3)

Similarly, for the y-velocity correction term:

\[
\sum a_{nb}v'_{nb} \approx v'_{i,j} \sum a_{nb}
\]

(4)