The following formulation, notation repeats from, Desrosiers and Lübbecke (2005).

0.1 Capacitated Shortest path

For graph $\mathcal{G}(V, A)$

$$
\begin{aligned}
z^\star := \min & \sum_{(i,j)\in A} c_{ij}x_{ij} \\
\text{s.t.} & \\
& \sum_{j:(s,j)\in A} x_{sj} = 1 \\
& \sum_{j:(i,j)\in A} x_{ij} - \sum_{j:(j,i)\in A} x_{ji} = 0 \qquad i \in I\backslash\{s,t\} \\
& \sum_{i:(i,t)\in A} x_{it} = 1 \\
& \sum_{(i,j)\in A} t_{ij}x_{ij} \le C \\
& x_{ij} = 0 \text{ or } 1 \quad (i,j) \in A
\end{aligned}
$$

with $p \in P$ as set of feasible s-t paths, Dantzig-Wolfe reformulation as follows:

$$
\begin{aligned}
z^\star = \min & \sum_{p\in P} \left(\sum_{(i,j)\in A} c_{ij}x_{pij} \right) \lambda_p \\
\text{s.t.} & \\
& \sum_{p\in P} \left(\sum_{(i,j)\in A} t_{ij}x_{pij} \right) \lambda_p \le C \\
& \sum_{p\in P} \lambda_p = 1 \\
& \lambda_p \ge 0 \quad p \in P \\
& \sum_{p\in P} x_{pij}\lambda_p = x_{ij} \quad (i,j) \in A \\
& x_{ij} = 0 \text{ or } 1 \quad (i,j) \in A
\end{aligned}
$$

Desrosiers J, Lübbecke ME (2005) A primer in column generation. *Column generation.* (Springer), 1–32.