Appendix C. Decomposition Algorithm

The algorithm is divided in two main parts composed by each of the loops; in the first one, the ramping lengths of the model run are identified by associating each marginal cost with the closest integer multiple of the thermal unit's variable cost, b, the coefficient of VC_t in (5). The second loop is the partitioning of the model's input data based on each period's marginal cost.

Algorithm 1 Dual-Based Partitioning of the Input Data

$VC_t \leftarrow$ *Thermal generator variable cost*
$VC_w \leftarrow$ *Wind generator variable cost*
$VC_{nsp} \leftarrow$ *NSP cost*
$T \leftarrow$ *Ordered index set with the time representation*
$Basis[\forall t \in T] \leftarrow$ **false**
$Model \leftarrow$ *Complete model solution*
$MC[t] \leftarrow$ *Marginal costs from Model*
$DualRUP[t] \leftarrow$ *Ramp-up constraint duals from Model*
$DualRDN[t] \leftarrow$ *Ramp-down constraint duals from Model*
$DualWnd[t] \leftarrow$ *Wind availability duals from Model*
for all $mc \in MC | (mc > 0 \wedge mc \notin [VC_t, VC_w])$ **do**
  $Lengths[mc] \leftarrow$ *Multiple of* VC_t closest to mc
end for
for all $t \in T$ **do**
  if $(MC[t] \notin [VC_t, VC_w])$ **then**
    if $MC[t] < 0$ **then**
      Find next $t' > t$ such that $MC[t'] = VC_{nsp}$
      $Basis[t : t'] \leftarrow$ **true**
      $t \leftarrow t' + 1$
    else if $MC[t] = VC_{nsp}$ **then**
      Find next $t' > t$ such that $MC[t'] \in [VC_t, VC_w]$
      $Basis[t : t'] \leftarrow$ **true**
    else
      $l \leftarrow Lengths[MC[t]]$
      if $DualRUP[t-1] > 0$ **then**
        $t' \leftarrow max\{t'\} | (t' < (t - l) \wedge DualWnd[t'] > 0)$
        $Basis[t' : t] \leftarrow$ **true**
      else if $DualRDN[t-1] > 0$ **then**
        $t' \leftarrow min\{t'\} | (t' < (t + l) \wedge DualWnd[t'] > 0)$
        $Basis[t : t'] \leftarrow$ **true**
      end if
      $t \leftarrow t' + 1$
    end if
  end if
  $Partition[p] \leftarrow$ Subsets of longest contiguous t
    such that $Basis[t_{start} : t_{end}] =$ **true**
end for