Algorithm 1 Trajectory Generation from DMP Sequences

Input: observed state $P_i = \{p_i, \dot{p}_i, \ddot{p}_i\}$, demonstration $P_d = \{P_{d,0}, \ldots, P_{d,M}\}$, and time step Δt

Output $P_G = \{p_G, \dot{p}_G, \ddot{p}_G\}$ Generated trajectory

$P_G^{t=0} \leftarrow P_i$

$m = \text{argmin}_m \|p_{d,m} - p_i\|_2$

$j \leftarrow j(m)$, $G \leftarrow G_j$, $\Theta \leftarrow \Theta_j$

$t_{ref,0} \leftarrow t_m \in [0, T_S)$ ▷ Time of reference at m

for $t_i = 0, \ldots, T_G$ **do**

  Calculate $\dot{P}_G^{t_i}(G, \Theta, z_i)$ at $z_i = z(t_{ref,0} + t_i)$ using DMP equations (i.e. Eqs. 1, 4, or 5)

  Integrate trajectory $P_G^{t_{i+1}} = P_G^{t_i} + \dot{P}_G^{t_i} \Delta t$

  if $t_i + t_m \geq T_G$ **then** ▷ Start next segment

    $G \leftarrow G_{j(m)+1}$

    $\Theta \leftarrow \Theta_{j[i]+1}$

    $t_{ref,0} \leftarrow 0$

  end if

end for