

# Implementations of OCT

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# OCT with Full Storage of Backward-Propagated States

# OCT with Full Storage

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$   
•                                      •                                      •                                      •

$\epsilon_1$

$\epsilon_2$

$\epsilon_{nt-2}$

$\epsilon_{nt-1}$

$\Psi_t$

$\Psi_i$

$\times$   
 $t_0 + \frac{dt}{2}$

$\times$   
 $t_0 + \frac{3}{2}dt$

...

$\times$   
 $T - \frac{3}{2}dt$

$\times$   
 $T - \frac{dt}{2}$

# OCT with Full Storage

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$   
•                                      •                                      •                                      •

$\epsilon_1$

$\epsilon_2$

$\epsilon_{nt-2}$

$\epsilon_{nt-1}$

$\Psi_{bw}(t)$

$\Psi_t$

$\Psi_i$

$\times$   
 $t_0 + \frac{dt}{2}$

$\times$   
 $t_0 + \frac{3}{2}dt$

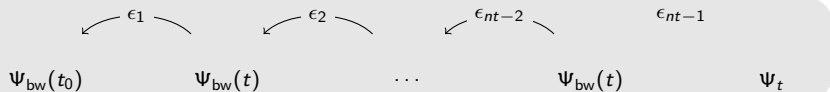
...

$\times$   
 $T - \frac{3}{2}dt$

$\times$   
 $T - \frac{dt}{2}$

# OCT with Full Storage

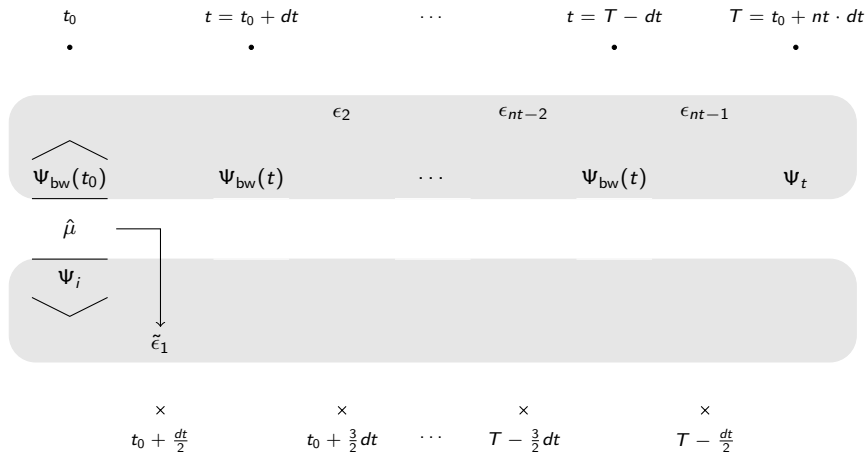
$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$   
•                                      •                                      •                                      •



$\Psi_i$

$\times$                        $\times$                        $\times$                        $\times$   
 $t_0 + \frac{dt}{2}$                        $t_0 + \frac{3}{2}dt$                       ...                       $T - \frac{3}{2}dt$                        $T - \frac{dt}{2}$

# OCT with Full Storage



# OCT with Full Storage

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$

•                                      •                                      •                                      •

$\epsilon_2$                                        $\epsilon_{nt-2}$                                        $\epsilon_{nt-1}$

$\Psi_{bw}(t_0)$                        $\Psi_{bw}(t)$                       ...                       $\Psi_{bw}(t)$                        $\Psi_t$

$\Psi_i$                        $\Psi_{fw}(t)$

$\tilde{\epsilon}_1$

$\times$   
 $t_0 + \frac{dt}{2}$

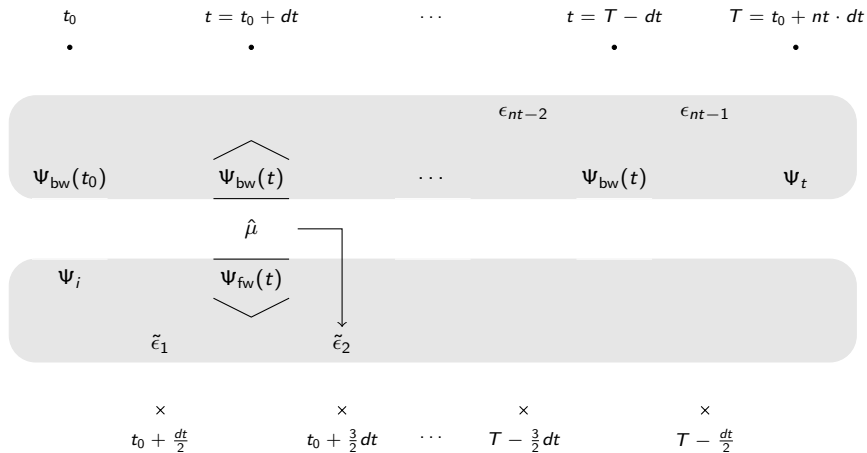
$\times$   
 $t_0 + \frac{3}{2} dt$

...

$\times$   
 $T - \frac{3}{2} dt$

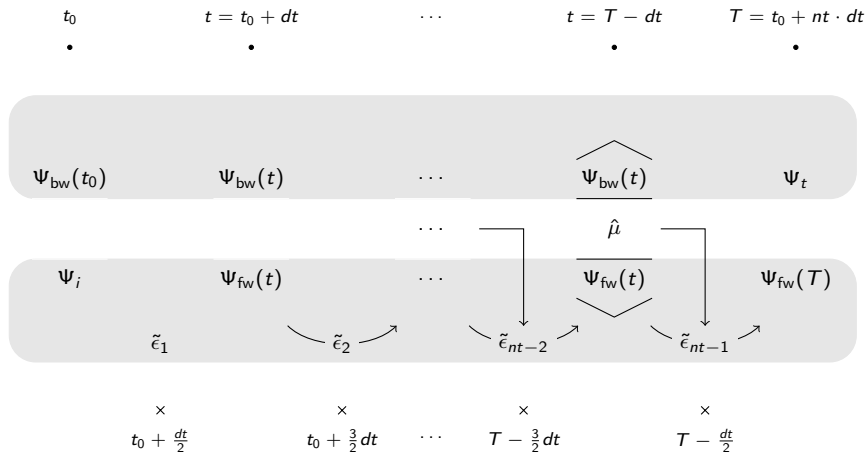
$\times$   
 $T - \frac{dt}{2}$

# OCT with Full Storage





# OCT with Full Storage



# OCT with Full Storage

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$

•                                      •                                      •                                      •

$\Psi_{\text{bw}}(t_0)$

$\Psi_{\text{bw}}(t)$

...

$\Psi_{\text{bw}}(t)$

$\Psi_t$

$\Psi_i$

$\Psi_{\text{fw}}(T)$

$\tilde{\epsilon}_1$

$\tilde{\epsilon}_2$

$\tilde{\epsilon}_{nt-2}$

$\tilde{\epsilon}_{nt-1}$

×

$t_0 + \frac{dt}{2}$

×

$t_0 + \frac{3}{2}dt$

...

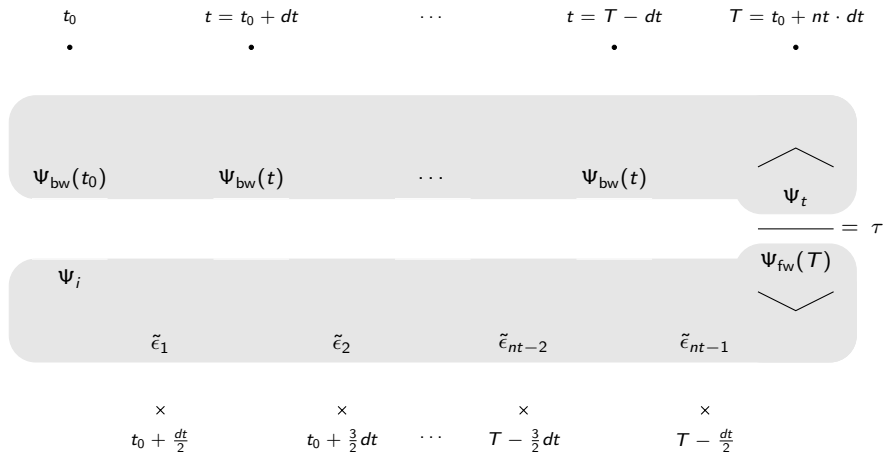
×

$T - \frac{3}{2}dt$

×

$T - \frac{dt}{2}$

# OCT with Full Storage



# OCT with No Storage of Backward-Propagated States

# OCT without Storage

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$   
•                                      •                                      •                                      •

$\epsilon_1$

$\epsilon_2$

$\epsilon_{nt-2}$

$\epsilon_{nt-1}$

$\Psi_t$

$\Psi_i$

$\times$   
 $t_0 + \frac{dt}{2}$

$\times$   
 $t_0 + \frac{3}{2}dt$

...

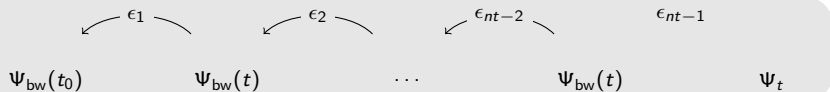
$\times$   
 $T - \frac{3}{2}dt$

$\times$   
 $T - \frac{dt}{2}$



# OCT without Storage

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$   
•                                      •                                      •                                      •



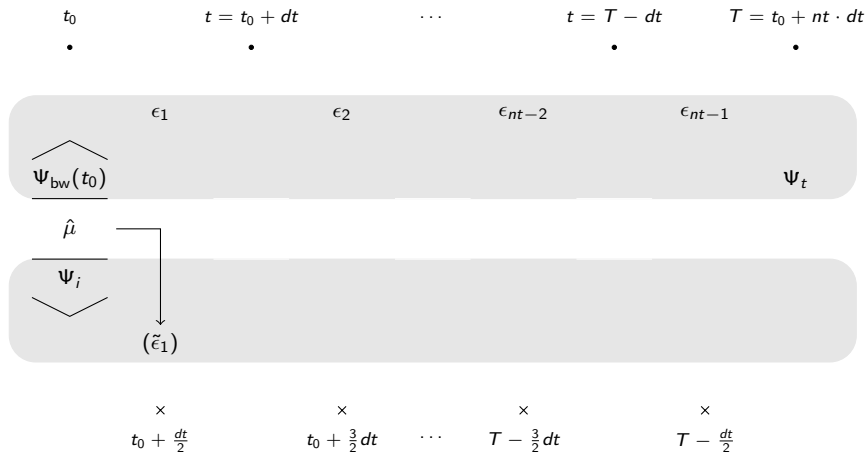
$\Psi_i$

$\times$                        $\times$                        $\times$                        $\times$   
 $t_0 + \frac{dt}{2}$                        $t_0 + \frac{3}{2}dt$                       ...                       $T - \frac{3}{2}dt$                        $T - \frac{dt}{2}$



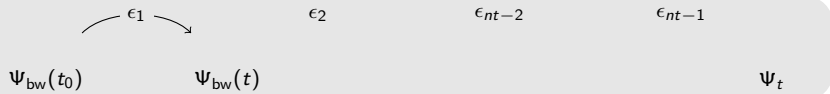


# OCT without Storage



# OCT without Storage

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$   
•                                      •                                      •                                      •



$\Psi_i$

$(\tilde{\epsilon}_1)$

$\times$   
 $t_0 + \frac{dt}{2}$

$\times$   
 $t_0 + \frac{3}{2}dt$

...

$\times$   
 $T - \frac{3}{2}dt$

$\times$   
 $T - \frac{dt}{2}$

# OCT without Storage

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$   
•                                      •                                      •                                      •

$\epsilon_2$

$\epsilon_{nt-2}$

$\epsilon_{nt-1}$

$\Psi_{bw}(t_0)$

$\Psi_{bw}(t)$

$\Psi_t$

$\Psi_i$

$\Psi_{fw}(t)$

$\tilde{\epsilon}_1$

$\times$   
 $t_0 + \frac{dt}{2}$

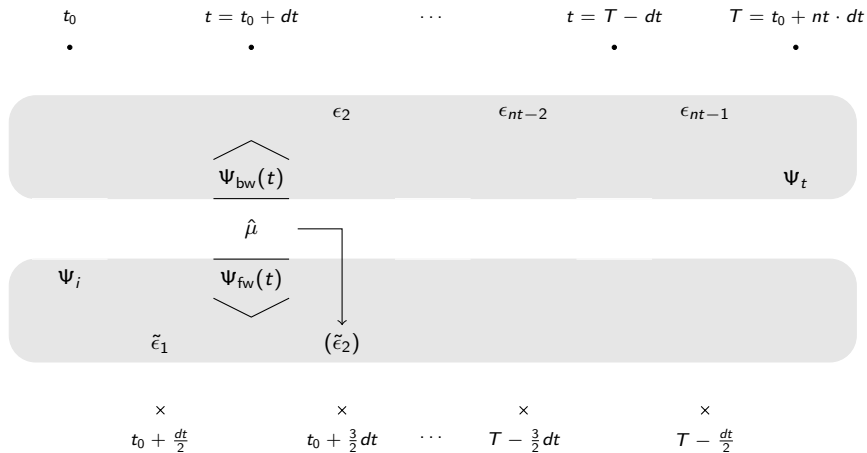
$\times$   
 $t_0 + \frac{3}{2}dt$

...

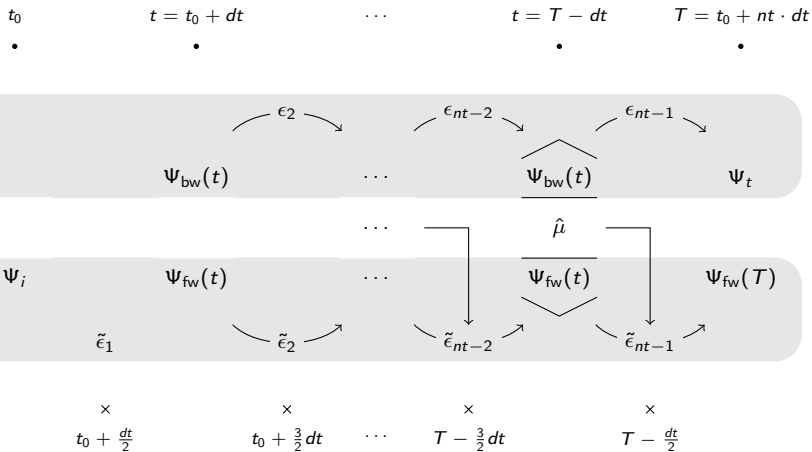
$\times$   
 $T - \frac{3}{2}dt$

$\times$   
 $T - \frac{dt}{2}$

# OCT without Storage



# OCT without Storage



# OCT without Storage

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$   
•                                      •                                      •                                      •

$\Psi_t$

$\Psi_i$

$\Psi_{\text{fw}}(T)$

$\tilde{\epsilon}_1$

$\tilde{\epsilon}_2$

$\tilde{\epsilon}_{nt-2}$

$\tilde{\epsilon}_{nt-1}$

$\times$   
 $t_0 + \frac{dt}{2}$

$\times$   
 $t_0 + \frac{3}{2}dt$

...

$\times$   
 $T - \frac{3}{2}dt$

$\times$   
 $T - \frac{dt}{2}$

# OCT without Storage

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$

•                                      •                                      •                                      •

$\psi_t$

$\tau$

$\psi_i$

$\psi_{fw}(T)$

$\tilde{\epsilon}_1$

$\tilde{\epsilon}_2$

$\tilde{\epsilon}_{nt-2}$

$\tilde{\epsilon}_{nt-1}$

$\times$   
 $t_0 + \frac{dt}{2}$

$\times$   
 $t_0 + \frac{3}{2}dt$

...

$\times$   
 $T - \frac{3}{2}dt$

$\times$   
 $T - \frac{dt}{2}$

# OCT with Segmented Storage of Backward-Propagated States







# OCT with Segmentation

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$   
•                                      •                                      •                                      •

$\psi_{bw}(t_0)$                        $\psi_{bw}(t)$                       ...                       $\psi_{bw}(t)$                        $\psi_t$

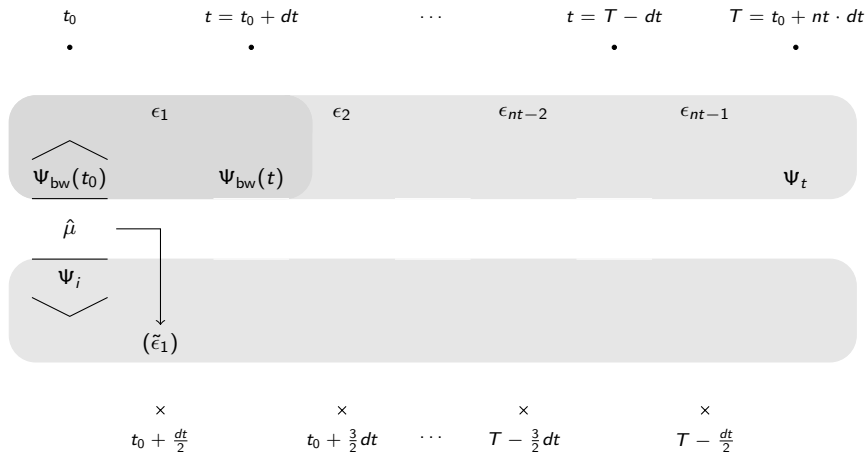
$\epsilon_1$                        $\epsilon_2$                       ...                       $\epsilon_{nt-2}$                        $\epsilon_{nt-1}$

$\psi_i$

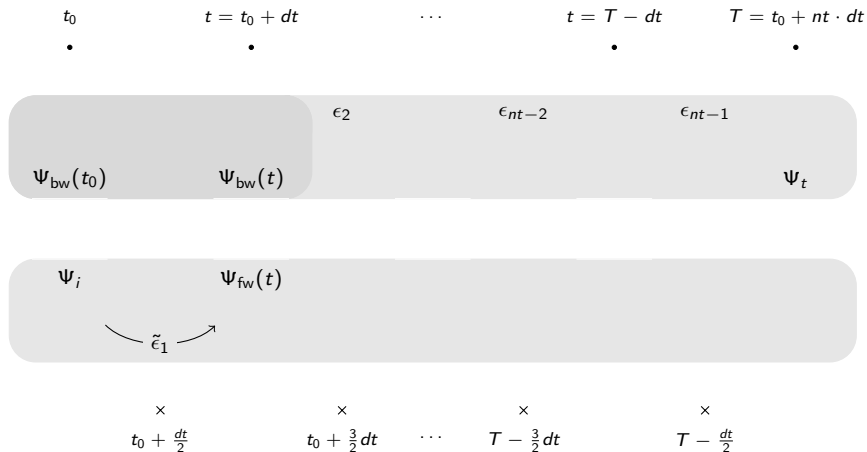
$\times$                        $\times$                       ...                       $\times$                        $\times$   
 $t_0 + \frac{dt}{2}$                        $t_0 + \frac{3}{2}dt$                        $T - \frac{3}{2}dt$                        $T - \frac{dt}{2}$



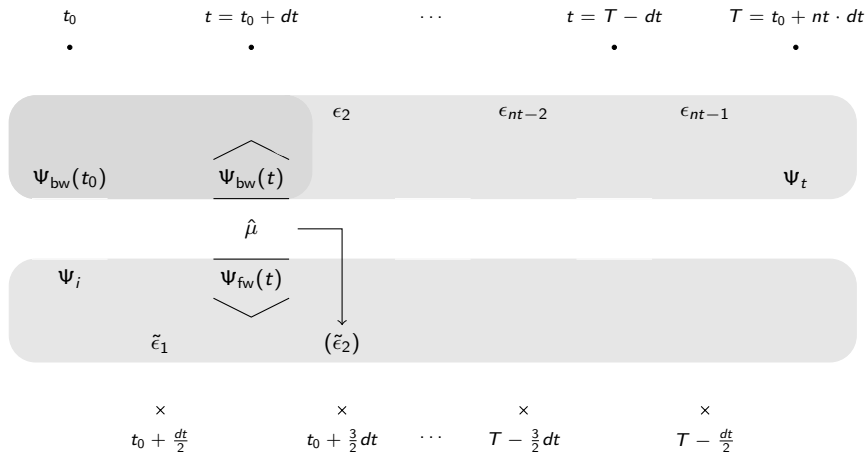
# OCT with Segmentation



# OCT with Segmentation

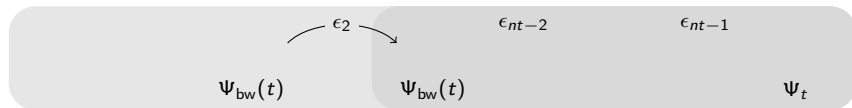


# OCT with Segmentation



# OCT with Segmentation

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$   
•                                      •                                      •                                      •



$\times$                        $\times$                        $\times$                        $\times$   
 $t_0 + \frac{dt}{2}$                        $t_0 + \frac{3}{2}dt$                       ...                       $T - \frac{3}{2}dt$                        $T - \frac{dt}{2}$



# OCT with Segmentation

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$   
•                                      •                                      •                                      •

$\epsilon_2$

$\epsilon_{nt-2}$                        $\epsilon_{nt-1}$

$\Psi_{bw}(t)$

$\Psi_{bw}(t)$

$\Psi_{bw}(t)$

$\Psi_t$

$\Psi_i$

$\Psi_{fw}(t)$

$\tilde{\epsilon}_1$

$(\tilde{\epsilon}_2)$

$\times$   
 $t_0 + \frac{dt}{2}$

$\times$   
 $t_0 + \frac{3}{2} dt$

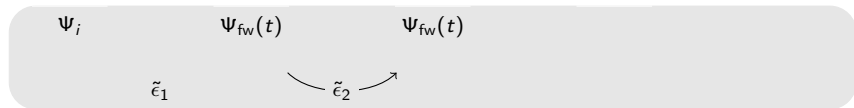
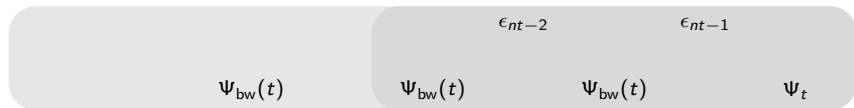
...

$\times$   
 $T - \frac{3}{2} dt$

$\times$   
 $T - \frac{dt}{2}$

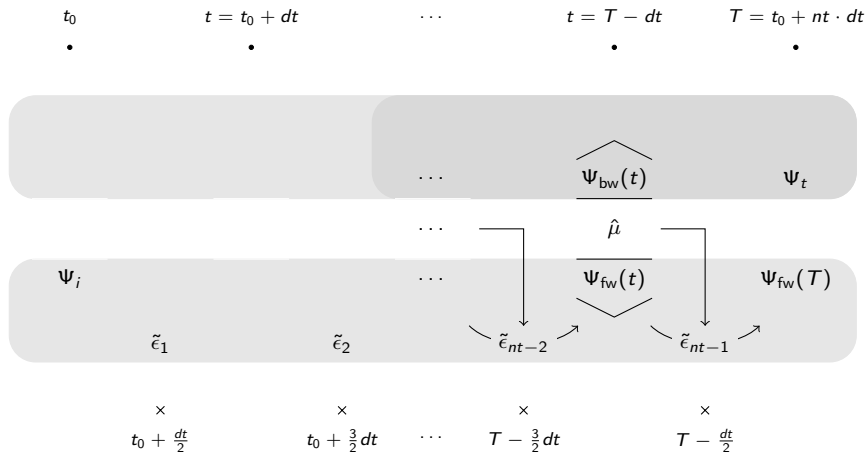
# OCT with Segmentation

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$   
•                                      •                                      •                                      •



$\times$                        $\times$                        $\times$                        $\times$   
 $t_0 + \frac{dt}{2}$                        $t_0 + \frac{3}{2}dt$                       ...                       $T - \frac{3}{2}dt$                        $T - \frac{dt}{2}$

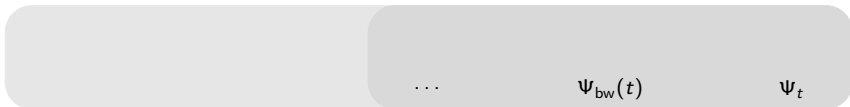
# OCT with Segmentation



# OCT with Segmentation

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$

•                                      •                                      •                                      •



×                      ×                      ×                      ×

$t_0 + \frac{dt}{2}$                        $t_0 + \frac{3}{2}dt$                       ...                       $T - \frac{3}{2}dt$                        $T - \frac{dt}{2}$

# OCT with Segmentation

$t_0$                        $t = t_0 + dt$                       ...                       $t = T - dt$                        $T = t_0 + nt \cdot dt$

•                                      •                                      •                                      •

$\Psi_t$

$\tau$

$\Psi_i$

$\Psi_{fw}(T)$

$\tilde{\epsilon}_1$

$\tilde{\epsilon}_2$

$\tilde{\epsilon}_{nt-2}$

$\tilde{\epsilon}_{nt-1}$

$\times$   
 $t_0 + \frac{dt}{2}$

$\times$   
 $t_0 + \frac{3}{2}dt$

...

$\times$   
 $T - \frac{3}{2}dt$

$\times$   
 $T - \frac{dt}{2}$