



At time t the integral is the area under the curve $f(t, \tau)$, which includes all of the white space below the orange ranging from the left side of the red bar to the left side of the blue bar. At time $t + dt$, the integral is expanded to include the orange area plus the blue area, and reduced by the red area. Dividing these areas by dt in the limit as dt goes to zero is the derivative of the definite integral.