A Few Notes On The Dirac Delta Function

David Meyer

dmm@{1-4-5.net,uoregon.edu,...}

Last update: May 10, 2021

1 Introduction

These notes began life as some thoughts on the Dirac Delta Function and evolved into notes on several related topics including Laplace Transforms. More TBD.

2 The Dirac Delta Function

We can think of the delta function as being defined as shown in Figure 1 and Equation 1. In the limit ($\epsilon \to 0$) the Dirac Delta function is written $\delta_a(t)$ or sometimes $\delta(t-a)$.

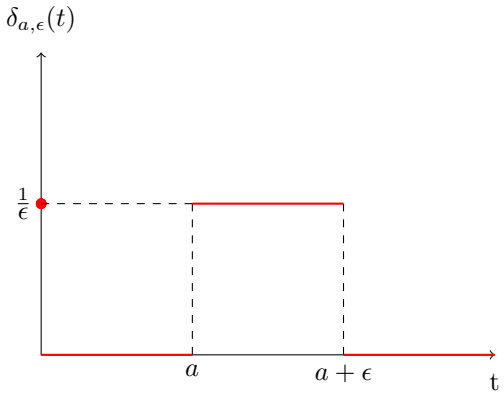

Figure 1: The $\delta_{a,\epsilon}(t)$ function

$\delta_{a,\epsilon}(t)$ is defined to be

$$\delta_{a,\epsilon}(t) = \begin{cases} \frac{1}{\epsilon} & a \le t \le a+\epsilon \\ 0 & \text{otherwise} \end{cases} \tag{1}$$

and has the constraint that

$$\int_0^\infty \delta_{a,\epsilon}(t) = 1$$

That is, $\delta_{a,\epsilon}(t)$ is in some sense a probability density.