

Table 1: Convolution Table

No	$f_1(t)$	$f_2(t)$	$f_1(t) * f_2(t) = f_2(t) * f_1(t)$
1	$f(t)$	$\delta(t - T)$	$f(t - T)$
2	$e^{\lambda t}u(t)$	$u(t)$	$\frac{1 - e^{\lambda t}}{-\lambda}u(t)$
3	$u(t)$	$u(t)$	$tu(t)$
4	$e^{\lambda_1 t}u(t)$	$e^{\lambda_2 t}u(t)$	$\frac{e^{\lambda_1 t} - e^{\lambda_2 t}}{\lambda_1 - \lambda_2}u(t), \quad \lambda_1 \neq \lambda_2$
5	$e^{\lambda t}u(t)$	$e^{\lambda t}u(t)$	$te^{\lambda t}u(t)$
6	$te^{\lambda t}u(t)$	$e^{\lambda t}u(t)$	$\frac{1}{2}t^2e^{\lambda t}u(t)$
7	$t^n u(t)$	$e^{\lambda t}u(t)$	$\frac{n!e^{\lambda t}}{\lambda^{n+1}}u(t) - \sum_{j=0}^n \frac{n!t^{n-j}}{\lambda^{j+1}(n-j)!}u(t)$
8	$t^m u(t)$	$t^n u(t)$	$\frac{m!n!}{(m+n+1)!}t^{m+n+1}u(t)$
9	$te^{\lambda_1 t}u(t)$	$e^{\lambda_2 t}u(t)$	$\frac{e^{\lambda_2 t} - e^{\lambda_1 t} + (\lambda_1 - \lambda_2)te^{\lambda_1 t}}{(\lambda_1 - \lambda_2)^2}u(t)$
10	$t^m e^{\lambda t}u(t)$	$t^n e^{\lambda t}u(t)$	$\frac{m!n!}{(n+m+1)!}t^{m+n+1}e^{\lambda t}u(t)$
11	$t^m e^{\lambda_1 t}u(t)$	$t^n e^{\lambda_2 t}u(t)$	$\sum_{j=0}^m \frac{(-1)^j m!(n+j)!t^{m-j}e^{\lambda_1 t}}{j!(m-j)!(\lambda_1 - \lambda_2)^{n+j+1}}$ $+ \sum_{k=0}^n \frac{(-1)^k n!(m+k)!t^{n-k}e^{\lambda_2 t}}{k!(n-k)!(\lambda_2 - \lambda_1)^{m+k+1}}u(t)$
12	$e^{\alpha t} \cos(\beta t + \theta)u(t)$	$e^{\lambda t}u(t)$	$\frac{\cos(\theta - \phi)e^{\lambda t} - e^{\lambda t} \cos(\beta t + \theta - \phi)}{\sqrt{(\alpha + \lambda)^2 + \beta^2}}u(t)$ $\phi = \tan^{-1}[-\beta/(\alpha + \lambda)]$
13	$e^{-\alpha t} \cos(\beta t + \theta)u(t)$	$e^{\lambda t}u(t)$	$\frac{e^{\lambda_1 t}u(t) + e^{\lambda_2 t}u(-t)}{\lambda_2 - \lambda_1} \quad \text{Re}\lambda_2 > \text{Re}\lambda_1$
14	$e^{\lambda_1 t}u(-t)$	$e^{\lambda_2 t}u(-t)$	$\frac{e^{\lambda_1 t} - e^{\lambda_2 t}}{\lambda_2 - \lambda_1}u(-t)$