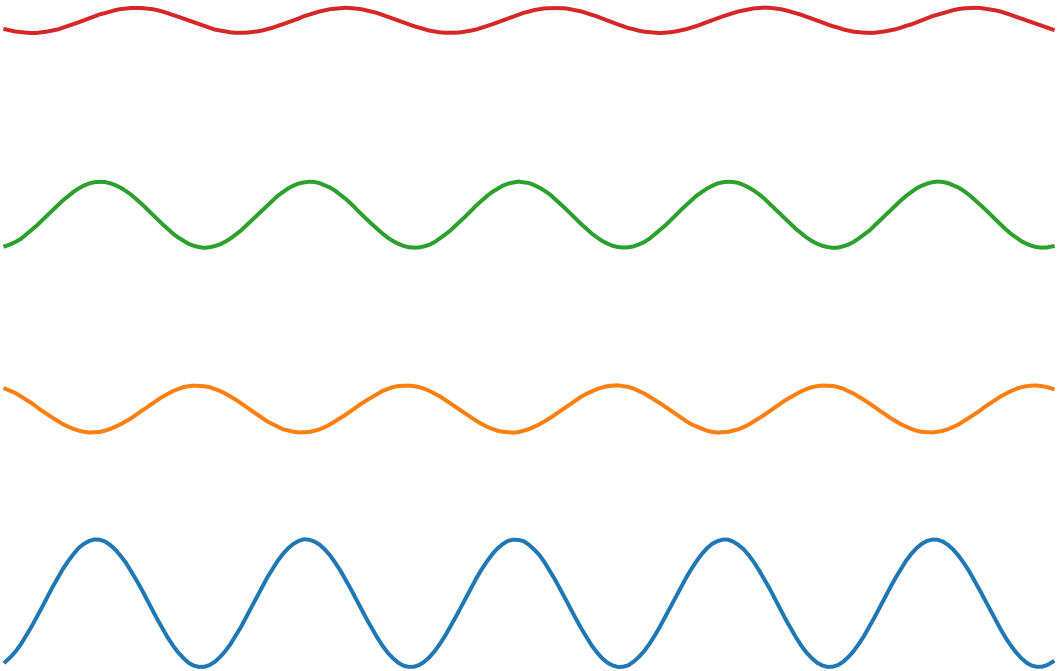cos_kernel