

Tablo: Fourier Sin ve Cos dönüşümlerinin temel özellikleri

Özellik	$f(t) / F_c(\omega) / F_s(\omega)$	$F_c(\omega) = \int_0^{\infty} f(t) \cos(\omega t) dt, \omega > 0$	$F_s(\omega) = \int_0^{\infty} f(t) \sin(\omega t) dt, \omega > 0$
Doğrusal	$\alpha f_1(t) + \beta f_2(t)$	$\alpha F_{c1}(\omega) + \beta F_{c2}(\omega)$	$\alpha F_{s1}(\omega) + \beta F_{s2}(\omega)$
Zamanda ölçekleme	$f(\alpha t)$ $\alpha > 0$	$\frac{1}{\alpha} F_c\left(\frac{\omega}{\alpha}\right)$	$\frac{1}{\alpha} F_s\left(\frac{\omega}{\alpha}\right)$
Zamanda öteleme	$f(t - \alpha)$	$\cos(\alpha\omega) F_c\{f(t)\} - \sin(\alpha\omega) F_s\{f(t)\}$	$\cos(\alpha\omega) F_s\{f(t)\} + \sin(\alpha\omega) F_c\{f(t)\}$
Frekansla öteleme	$F_c(\omega \pm \alpha),$ $F_s(\omega \pm \alpha)$	$F_c\{f(t) \cos(\alpha\omega)\} \mp F_s\{f(t) \sin(\alpha\omega)\}$	$F_s\{f(t) \cos(\alpha\omega)\} \pm F_c\{f(t) \sin(\alpha\omega)\}$
Zamanda türev	$f'(t)$	$-\sqrt{\frac{2}{\pi}} f(0) + \omega F_s\{f(t)\}$	$\omega F_c\{f(t)\}$
Frekansla türev	$F_c^{(2n)}(\omega)$	$F_c\{(-1)^n t^{2n} f(t)\}$	$F_s\{(-1)^n t^{2n} f(t)\}$
	$F_c^{(2n+1)}(\omega)$	$F_c\{(-1)^{n+1} t^{2n+1} f(t)\}$	$F_s\{(-1)^{n+1} t^{2n+1} f(t)\}$
Zamanda integral	$\int_t^{\infty} f(\tau) d\tau$	$\frac{1}{\omega} F_s(f(t))$	$\frac{1}{\omega} F_c(f(t))$
Frekansla integral	$\int_{\omega}^{\infty} F_c(\tau) d\tau,$	$F_s\left\{-\frac{f(t)}{t}\right\}$	$F_c\left\{\frac{f(t)}{t}\right\}$
	$\int_{\omega}^{\infty} F_s(\tau) d\tau$		
Tersleme	F_c, F_s	$F_c = F_c^{-1}$	$F_s = F_s^{-1}$
Asimptot	$F_c(\omega),$ $F_s(\omega)$	$\lim_{\omega \rightarrow \infty} F_c(\omega) = 0$	$\lim_{\omega \rightarrow \infty} F_s(\omega) = 0$
	$f(\alpha t) \cos(\beta t)$ $\alpha, \beta > 0$	$\frac{1}{2\alpha} \left\{ F_c\left(\frac{\omega + \beta}{\alpha}\right) + F_c\left(\frac{\omega - \beta}{\alpha}\right) \right\}$	$\frac{1}{2\alpha} \left\{ F_s\left(\frac{\omega + \beta}{\alpha}\right) + F_s\left(\frac{\omega - \beta}{\alpha}\right) \right\}$
	$f(\alpha t) \sin(\beta t)$ $\alpha, \beta > 0$	$\frac{1}{2\alpha} \left\{ F_s\left(\frac{\omega + \beta}{\alpha}\right) - F_s\left(\frac{\omega - \beta}{\alpha}\right) \right\}$	$-\frac{1}{2\alpha} \left\{ F_c\left(\frac{\omega + \beta}{\alpha}\right) - F_c\left(\frac{\omega - \beta}{\alpha}\right) \right\}$
	$t^{2n} f(t)$	$(-1)^n \frac{d^{2n}}{d\omega^{2n}} F_c(\omega)$	$(-1)^n \frac{d^{2n}}{d\omega^{2n}} F_s(\omega)$
	$t^{2n+1} f(t)$	$(-1)^n \frac{d^{2n+1}}{d\omega^{2n+1}} F_s(\omega)$	$(-1)^n \frac{d^{2n+1}}{d\omega^{2n+1}} F_c(\omega)$
	$\int_t^{\infty} f(\tau) d\tau \leftrightarrow \frac{1}{\omega} F_s(\omega)$	$f_o(t + \alpha) + f_o(t - \alpha) \leftrightarrow 2F_s(\omega) \cos(\alpha\omega)$	
	$f(t + \alpha) - f_o(t - \alpha) \leftrightarrow 2F_s(\omega) \sin(\alpha\omega), \alpha > 0$	$f_c(t - \alpha) - f_c(t + \alpha) \leftrightarrow 2F_c(\omega) \sin(\alpha\omega)$	

Tablo: Ayrık Sin ve Cos dönüşümü ifadeleri

DCT	DST
$X_c[i] = \sqrt{\frac{2}{N}} \sum_{j=0}^N k_i k_j \cos\left(\frac{ij\pi}{N}\right) x[j]$	$X_s[i] = \sqrt{\frac{2}{N}} \sum_{j=1}^{N-1} \sin\left(\frac{ij\pi}{N}\right) x[j]$
$x[j] = \sqrt{\frac{2}{N}} \sum_{i=0}^N k_i k_j \cos\left(\frac{ij\pi}{N}\right) X_c[i]$	$x[j] = \sqrt{\frac{2}{N}} \sum_{i=1}^{N-1} \sin\left(\frac{ij\pi}{N}\right) X_s[i]$
$k_i = \begin{cases} 1 & , i \neq 0, N \\ 1/\sqrt{2} & , i = 0, N \end{cases}$	

Tablo: Normalize edilmiş DCT ve DST ifadeleri

DCT		
p pozitif tamsayı, $N = 2^p$, $k_i = \begin{cases} 1 & , i \neq 0, N \\ 1/\sqrt{2} & , i = 0, N \end{cases}$		
DCT-I	$[C_{N+1}^I]_{mn} = \sqrt{\frac{2}{N}} \left[k_m k_n \cos\left(\frac{mn\pi}{N}\right) \right]$	$m, n = 0, 1, \dots, N$
DCT-II	$[C_N^{II}]_{mn} = \sqrt{\frac{2}{N}} \left[k_n \cos\left(\frac{(2m+1)n\pi}{2N}\right) \right]$	$m, n = 0, 1, \dots, N-1$
DCT-III	$[C_N^{III}]_{mn} = \sqrt{\frac{2}{N}} \left[k_m \cos\left(\frac{(2n+1)m\pi}{2N}\right) \right]$	$m, n = 0, 1, \dots, N-1$
DCT-IV	$[C_N^{IV}]_{mn} = \sqrt{\frac{2}{N}} \left[\cos\left(\frac{(2m+1)(2n+1)\pi}{4N}\right) \right]$	$m, n = 0, 1, \dots, N-1$
DST		
p pozitif tamsayı, $N = 2^p$, $k_i = \begin{cases} 1 & , i \neq N-1 \\ 1/\sqrt{2} & , i = N-1 \end{cases}$		
DST-I	$[S_{N-1}^I]_{mn} = \sqrt{\frac{2}{N}} \left[\sin\left(\frac{(m+1)(n+1)\pi}{N}\right) \right]$	$m, n = 0, 1, \dots, N-2$
DST-II	$[S_N^{II}]_{mn} = \sqrt{\frac{2}{N}} \left[k_n \sin\left(\frac{(2m+1)(n+1)\pi}{2N}\right) \right]$	$m, n = 0, 1, \dots, N-1$
DST-III	$[S_N^{III}]_{mn} = \sqrt{\frac{2}{N}} \left[k_m \sin\left(\frac{(2n+1)(m+1)\pi}{2N}\right) \right]$	$m, n = 0, 1, \dots, N-1$
DST-IV	$[S_N^{IV}]_{mn} = \sqrt{\frac{2}{N}} \left[\sin\left(\frac{(2m+1)(2n+1)\pi}{4N}\right) \right]$	$m, n = 0, 1, \dots, N-1$

Tablo: DCT ve DST matrisleri arasındaki ilişkiler

DCT	DST
$[C_{N+1}^I]^{-1} = [C_{N+1}^I]^T = [C_{N+1}^I]$	$[S_{N+1}^I]^{-1} = [S_{N+1}^I]^T = [S_{N+1}^I]$
$[C_N^{II}]^{-1} = [C_N^{II}]^T = [C_N^{III}]$	$[S_N^{II}]^{-1} = [S_N^{II}]^T = [S_N^{III}]$
$[C_N^{III}]^{-1} = [C_N^{III}]^T = [C_N^{II}]$	$[S_N^{III}]^{-1} = [S_N^{III}]^T = [S_N^{II}]$
$[C_N^{IV}]^{-1} = [C_N^{IV}]^T = [C_N^{IV}]$	$[S_N^{IV}]^{-1} = [S_N^{IV}]^T = [S_N^{IV}]$