Consider the complex Fourier coefficients for a **periodic signal** $f(t)$:

$$D_n \quad (n = 0, \pm 1, \pm 2, ...)$$
$$D_n = |D_n| e^{\angle D_n} \quad (D_n \text{ is generally complex})$$
$$D_n = \mathrm{Re}\{D_n\} + j\,\mathrm{Im}\{D_n\}$$
$$D_0 \text{ is real}$$

If the signal* $f(t) = f_{even}(t) + f_{odd}(t)$ is **real**, then the exponential Fourier series coefficients have the following properties:

1. $D_n = D_{-n}^* \Rightarrow |D_n| = |D_{-n}| \text{ and } \angle D_n = -\angle D_{-n}$
2. $f_{even}(t) \Leftrightarrow \mathrm{Re}\{D_n\} \quad \text{and} \quad f_{odd}(t) \Leftrightarrow j\,\mathrm{Im}\{D_n\}$
3. $\mathrm{Re}\{D_n\} \text{ and } |D_n| \text{ are even}$
4. $\mathrm{Im}\{D_n\} \text{ and } \angle D_n \text{ are odd}$
5. $\text{If } f(t) \text{ is even, then } \mathrm{Im}\{D_n\} = 0$
6. $\text{If } f(t) \text{ is odd, then } \mathrm{Re}\{D_n\} = 0$

If $f(t)$ is a power signal, then (according to Parseval's theorem):

$$\text{Signal Power} = \frac{1}{T_0}\int_{t_0}^{t_0+T_0} |f(t)|^2\,dt = C_0^2 + \frac{1}{2}\sum_{n=1}^{\infty} C_n^2 = D_0^2 + 2\sum_{n=1}^{\infty} D_n^2$$

*Note: a real function $f(t)$ can always be written as the sum of an odd function and an even function: $f(t) = f_{even}(t) + f_{odd}(t)$ *with*

$$f_{even}(t) = \frac{1}{2}\left[f(t) + f(-t)\right]$$
$$f_{odd}(t) = \frac{1}{2}\left[f(t) - f(-t)\right]$$