常见的三角积式展开的推导

Saturday, June 24, 2023 9:56 AM

1、$\cos^3\psi = \frac{3}{4}\cos\psi + \frac{1}{4}\cos 3\psi$

解：有：和差化积：$\cos a \cos b = \frac{1}{2}[\cos(a+b) + \cos(a-b)]$

$\cos^3\psi = \cos^2\psi \cos\psi = \frac{1}{2}[\cos 2\psi + 1]\cos\psi = \frac{1}{2}\cos 2\psi\cos\psi + \frac{1}{2}\cos\psi$ ①

先解

$= \frac{1}{4}[\cos 3\psi + \cos\psi] + \frac{1}{2}\cos\psi = \frac{3}{4}\cos\psi + \frac{1}{4}\cos 3\psi$

2、$\cos^2\psi \cos 3\psi = \frac{1}{2}[\cos 2\psi + 1]\cos 3\psi$

$= \frac{1}{2}\cos 3\psi \cos 2\psi + \frac{1}{2}\cos 3\psi$

$= \frac{1}{4}\cos 5\psi + \frac{1}{4}\cos\psi + \frac{1}{2}\cos 3\psi = \frac{1}{4}\cos 5\psi + \frac{1}{2}\cos 3\psi + \frac{1}{4}\cos\psi$