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Let $I(R)=\int_{[0,R]^n}\exp[i\lambda\varphi(x)]\,dx$, where φ is a polynomial of degree d. Assume $d>n$, the coefficients of the principal part of φ to be ≥ 0, the coefficients of $x_1^d,\cdots,x_n^d$ to be >0. Then $\lim_{R\to\infty}I(R)=-q^n\int_{[0,\infty)^n}\exp[\lambda\Phi(x)]\,dx$, where $q=\exp[i\pi/2d]$.

Now let $J(\lambda)=\int_{[0,\infty]^n}\exp[\lambda\Phi(x)]\,dx$, where λ is large, Φ is a polynomial of degree d, $\Phi(x)=\sum_\mu a_\mu x^\mu$, $\operatorname{Re}a_\mu\leq 0$, $\Phi(0)=0$ and 0 is a critical point of Φ. Then the asymptotic behaviour of $J(\lambda)$ is explicitly given in the two simplest cases. Other cases will be given in another paper.

Reviewed by *Jean Leray*