Pokroky matematiky, fyziky a astronomie

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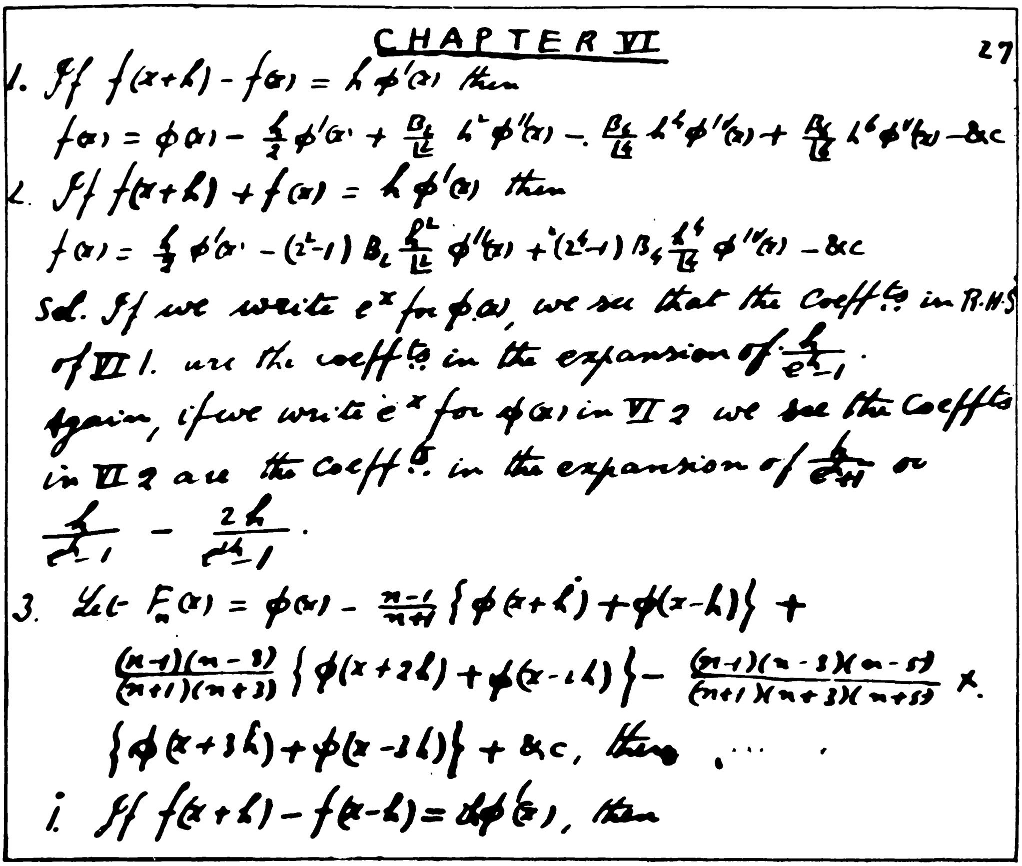
Krása a hľadanie krásy vo vede [Obrazová příloha]

Pokroky matematiky, fyziky a astronomie, Vol. 31 (1986), No. 4, [216a]--[216d]

Persistent URL: http://dml.cz/dmlcz/138882

Nasledujúce štyri obrázky patria k článku S. Chandrasekhara „Krása a hľadanie krásy vo vede", str. 193 — 202.


CHAPTER VI 27

1. If $f(x+h) - f(x) = h\phi'(x)$ then

$f(x) = \phi(x) - \frac{h}{2}\phi'(x) + \frac{B_2}{\underline{|2}} h^2 \phi''(x) - \frac{B_4}{\underline{|4}} h^4 \phi^{iv}(x) + \frac{B_6}{\underline{|6}} h^6 \phi^{vi}(x) - \&c$

2. If $f(x+h) + f(x) = h\phi'(x)$ then

$f(x) = \frac{h}{2}\phi'(x) - (2^2-1) B_2 \frac{h^2}{\underline{|2}} \phi''(x) + (2^4-1) B_4 \frac{h^4}{\underline{|4}} \phi^{iv}(x) - \&c$

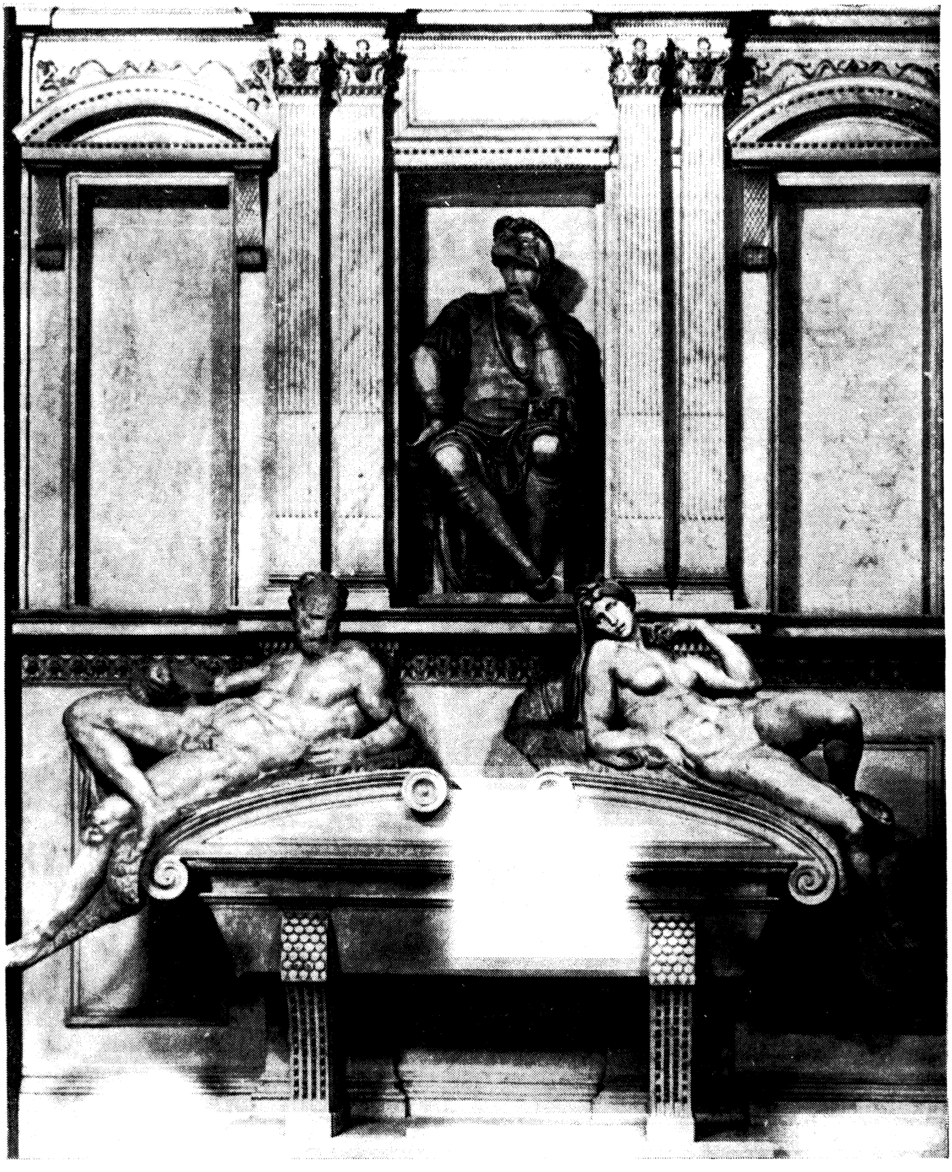
Sol. If we write e^x for $\phi(x)$, we see that the coeffts in R.H.S of VI 1. are the coeffts in the expansion of $\frac{h}{e^h-1}$. Again, if we write e^x for $\phi(x)$ in VI 2 we see the coeffts in VI 2 are the coeffts in the expansion of $\frac{h}{e^h+1}$ or $\frac{h}{e^h-1} - \frac{2h}{e^{2h}-1}$.

3. Let $F_n(x) = \phi(x) - \frac{n-1}{n+1}\{\phi(x+h) + \phi(x-h)\} + \frac{(n-1)(n-3)}{(n+1)(n+3)}\{\phi(x+2h) + \phi(x-2h)\} - \frac{(n-1)(n-3)(n-5)}{(n+1)(n+3)(n+5)} \times \{\phi(x+3h) + \phi(x-3h)\} + \&c$, then . . . .

4. If $f(x+h) - f(x-h) = 2h\phi'(x)$, then

Časť strany z Ramanujanových zápisníkov. Tieto zápisníky, z ktorých jeden len nedávno objavili, obsahujú bohatstvo teorém a dôkazov teórie čísel. (Z faksimilového vydania zostaveného K. CHANDRASEKHAROM, Tata, inštitút pre základný výskum, Bombay, 1957.)

Hrobky Mediciovcov, dotvorené Michelangelom, so sochami reprezentujúcimi Noc, Deň.



Súmrak a Svitanie.

and if we write $\bar{P}$ for the average value of P for the N molecules in unit of volume, then taking the sum of the effects of the encounters—

$$\Sigma\delta P = N\delta\bar{P} \qquad \text{.................................(14).}$$

We thus find

$$\frac{\delta P}{\delta t} = N\iiiint\!\!\iiiint Q \sin^2\theta\cos^2\theta\, Vbdbd\phi f_1 f_2 d\xi_1 d\eta_1 d\zeta_1 d\xi_2 d\eta_2 d\zeta_2 \quad \text{...(15).}$$

Now, since θ is a function of b and V, the definite integral

$$V\int_0^{2\pi}\int_0^{\infty} b\sin^2\theta\cos^2\theta db d\phi = B \qquad \text{.........................(16)}$$

will be a function of V only.

If the molecules are "rigid-elastic" spheres of diameter s,

$$B = \tfrac{1}{8}\pi s^2 V \qquad \text{.....................................(17).}$$

If they repel each other with a force inversely as the fifth power of the distance, so that at a distance r the force is κr^{-5}, then

$$B = \left(\frac{2\kappa}{M}\right)^{\frac{1}{2}} A_2 \qquad \text{.................................(18)}$$

where A_2 is the numerical quantity 1·3682. In this case B is independent of V.

The experiments of O. E. Meyer*, Kundt and Warburg†, Puluj‡, Von Obermayer§, Eilhard Wiedemann‖, and Holman¶, shew that the viscosity of air varies according to a lower power of the absolute temperature than the first, probably the 0·77 power. If the viscosity had varied as the first power

Časť Maxwellovej diskusie o viskozite plynov. Ukazujeme ten odsek, v ktorom sa uvádza, že sila medzi molekulami sa mení ako inverzná piata mocnina vzdialenosti. (Z W. D. NEVIN, ed., *Vedecké články Jamesa Clerka Maxwella*, Cambridge U. P., Cambridge, 1890.)