Kurs komputerowy T—LaTeX

Zadania (10)

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1. Wprowadź poniższe wzory:

(a)

$$\int \mathcal{Y}^M_{Jjl}(\hat{\boldsymbol{r}}, \hat{\boldsymbol{R}})^* \, V(\hat{\boldsymbol{r}}, \theta) \, \mathcal{Y}^M_{Jj'l'}(\hat{\boldsymbol{r}}, \hat{\boldsymbol{R}}) \, \mathrm{d}^2\hat{\boldsymbol{r}} \, \mathrm{d}^2\hat{\boldsymbol{R}}$$
$$= \frac{\hbar^2}{2m} \langle jl; J|U|j'l'; J\rangle = \sum_n V_n(r) \langle jl; J|P_n(\cos\theta)|j'l'; J\rangle$$

(b)

$$\begin{aligned}\sigma_0(j_a, j_b) =& \frac{\pi}{k_j^2} \sum_{J_a, J_b, l, l'} (-1)^{l-l'} (2J_a + 1)(2(J_b + 1) \begin{Bmatrix} j_a & 1 & j_b \\ J_b & l & J_a \end{Bmatrix} \begin{Bmatrix} j_a & 1 & j_b \\ J_b & l' & J_a \end{Bmatrix} \\ & \times \left[\delta(j, j') - \mathrm{S}^{J_b}(j_b, l'; j_b, l)^* \mathrm{S}^{J_b}(j_a, l'; j_a, l)\right]\end{aligned} \tag{1}$$

(c)

$$f(v|v_1) = \frac{4v}{\pi v_1 \langle v_2\rangle} \sinh\left(\frac{8 v_1 v}{\pi \langle v_2\rangle^2}\right) \exp\left[-\frac{4}{\pi} \frac{v_1^2 + v^2}{\langle v_2\rangle^2}\right]$$

(d)

$$\oint_{\partial\Sigma} \mathbf{E} \cdot \mathrm{d}\boldsymbol{\ell} = -\frac{\mathrm{d}}{\mathrm{d}t} \iint_\Sigma \mathbf{B} \cdot \mathrm{d}\mathbf{S} \tag{2}$$

$$\oint_{\partial\Sigma} \mathbf{B} \cdot \mathrm{d}\boldsymbol{\ell} = \mu_0 \iint_\Sigma \mathbf{J} \cdot \mathrm{d}\mathbf{S} + \mu_0 \varepsilon_0 \frac{\mathrm{d}}{\mathrm{d}t} \iint_\Sigma \mathbf{E} \cdot \mathrm{d}\mathbf{S} \tag{3}$$

(e)

$$Y_{\ell m} = \begin{cases} \frac{i}{\sqrt{2}} \left(Y_\ell^m - (-1)^m Y_\ell^{-m}\right) & \text{if } m < 0 \\ Y_\ell^0 & \text{if } m = 0 \\ \frac{1}{\sqrt{2}} \left(Y_\ell^{-m} + (-1)^m Y_\ell^m\right) & \text{if } m > 0. \end{cases} \tag{4}$$