$$+ a_{(2)k\sigma}\psi_{(2)}[z-(2m+1)d]e^{ik\rho}\, e^{ik_z(2m+1)d}. \qquad (2)$$

Here $k=(k, k_z)$, S is the normalization area in the plane, N - the number of periods along z, $\psi_{(1)}$ and $\psi_{(2)}$ are the localized wave functions of the superconducting and normal layers, and the $a_{(i)k\sigma}$ - the corresponding annihilation operators. We assume that H_1 has only diagonal matrix elements between $\psi_{(1)}\, e^{ik\rho}$ with the same m, and they correspond to the kinetic energy in the S-planes, and similarly for H_2 for the N-planes. The hopping part, T, has off-diagonal matrix elements between $\psi_{(1)}$ and $\psi_{(2)}$, with adjacent m's and the same σ's which are equal to $t/2$ (it can be said, that the operator T transforms $\psi_{(1)}(z-2md)$ into $\psi_{(2)}[z-(2m+1)d]$ and vice versa). The interaction part I has matrix elements equal to -g only in the same superconducting layer.

Substituting (2) into $H-N\mu$ we get

$$H-N\mu = \sum_{k\sigma} [a^{+}_{(1)k\sigma}\xi_1(k)a_{(1)k\sigma} + a^{+}_{(2)k\sigma}\xi_2(k)a_{(2)k\sigma}$$

$$+ t\cos k_z d\,(a^{+}_{(1)k\sigma}a_{(2)k\sigma} + a^{+}_{(2)k\sigma}a_{(1)k\sigma})]$$

$$- \frac{g}{SN}\sum_{k_1+k_2-k_3-k_4=0} a^{+}_{(1)k_1-}a^{+}_{(1)k_2+}a_{(1)k_3+}a_{(1)k_4-}\ ; \qquad (3)$$

indices $\sigma=+,-$ refer to the spin projections, $\xi_{12} = v_{12}(k - k_o)$. In the self-consistent field approximation we substitute the interaction term by

$$- \Delta^* \sum_k a_{(1)k+}a_{(1)-k-} - \Delta \sum_k a^{+}_{(1)-k-}a^{+}_{(1)k+} \qquad (4)$$

where

$$\Delta = \frac{g}{SN}\sum_k \langle a_{(1)k+}a_{(1)-k-}\rangle \qquad (5)$$

We shall make the following assumptions: $t \ll \Delta\sqrt{\beta}$, $\beta = m_1/m_2 \ll 1$. Then the eigenvalues are

$$\varepsilon_1 \cong [\xi_1^2 + \Delta^2 + 2t^2(k_z)]^{1/2}, \quad \varepsilon_2 \cong [\xi_2^2 + t^4(k_z)/\Delta^2]^{1/2}$$

$$\varepsilon_3 = -\varepsilon_2, \quad \varepsilon_4 = -\varepsilon_1 \quad ; \; t(k_z) = t\cos k_z d \qquad (6)$$