TSUKUBA J. MATH.
Vol. 13 No. 1 (1989), 175—189

ON THE PRESENTATIONS OF THE FUNDAMENTAL GROUPS OF 3-MANIFOLDS

By

Moto-o TAKAHASHI

In this paper we shall treat the closed 3-manifolds obtained by Dehn surgeries along certain links and find presentations of their fundamental groups.

§ 1. The 3-chain link.

First we consider the 3-chain link K_1 illustrated in the Figure 1.

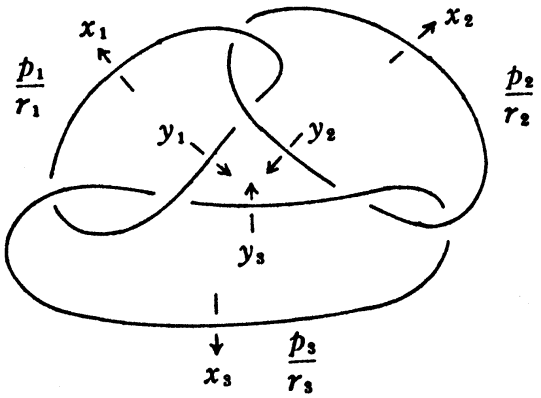

Figure 1

We do Dehn surgery along each component of K_1. Let p_1/r_1, p_2/r_2, p_3/r_3 be the surgery coefficients along three components L_1, L_2, L_3 of K_1, respectively, where p_i and r_i are co-prime integers ($i=1, 2, 3$). We denote the resulting 3-manifold by $M_1(p_1, r_1; p_2, r_2; p_3, r_3)$.

We shall find presentations of the fundamental group $\pi_1(M_1(p_1, r_1; p_2, r_2; p_3, r_3))$ of $M_1(p_1, r_1; p_2, r_2; p_3, r_3)$, by the following way.

First we shall find a presentation of the link group G of K_1.

The Wirtinger presentation of G is:

$$\langle x_1, x_2, x_3, y_1, y_2, y_3 \mid y_2x_1=x_1x_2,\ y_3x_2=x_2x_3,\ y_1x_3=x_3x_1,$$
$$x_1y_2=y_2y_1,\ x_2y_3=y_3y_2,\ x_3y_1=y_1y_3\rangle. \qquad (1)$$

Received October 2, 1987. Revised June 24, 1988.