

Werk

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that the cohomology of finite groups commutes with direct products, (ii) follows from the Approximation Lemma ([3], ch. I § 3).

Proof of the Theorem : Let us consider the exact sequences of G -modules

$$0 \rightarrow L \xrightarrow{D} V_L \xrightarrow{\Psi} V_L/D(L) \rightarrow 0,$$

$$0 \rightarrow B \xrightarrow{D} V_B \xrightarrow{\Psi} V_B/D(B) \rightarrow 0.$$

If we look at the two induced long exact sequences of cohomology groups, and since $H^i(G, L) = 0 = H^i(G, V_L)$ for any $i \in \mathbb{Z}$, then $H^i(G, V_L/D(L)) = 0$. On the other hand

$$\begin{aligned} V_B/D(B) &= V_B/V_B \cap D(L) \\ &= V_{B+D(L)}/D(L) = V_L/D(L) \quad (\text{by Lemma 3 (ii)}) ; \end{aligned}$$

therefore

$$H^i(G, V_B/D(B)) = 0 \quad (\text{for } i \in \mathbb{Z}),$$

and so $H^i(G, B) = H^i(G, V_B)$. Lemma 3 (i) completes the proof.

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