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ERRATUM TO "LOCALIZATION OF EQUIVARIANT COHOMOLOGY RINGS"

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This note corrects the proof of Theorem 3.8 of [**1**].

THEOREM 3.8. *If G is finite, the isolated primary ideals of $H_G(X)$ are of the form*

$$\mathfrak{g}_{(A,c)} = \ker\left(H_G(X) \to H_{C_G(A,c)}(c)\right),$$

where (A, c) is a maximal pair of $\mathscr{A}(G, X)$.

PROOF. Consider the map

$$H_G(X) \overset{r_{G,C}}{\to} H_{C_G(A,c)}(c).$$

Let $\mathfrak{p}^C = \mathfrak{p}^C_{(A,c)}$ and $\mathfrak{p} = \mathfrak{p}_{(A,c)}$ be as in the proof of 3.7. Since $\mathfrak{p}^C$ is the only associated prime of $H_{C_G(A,c)}(c)$ (this ring is Cohen-Macaulay by [**2**], so has no embedded primes, and $\mathfrak{p}^C$ is the only *minimal* prime by [**3**]), we see that {zero divisors of $H_{C_G(A,c)}(c)\} = \mathfrak{p}^C$. (In general, the set of zero divisors in a commutative Noetherian ring is the union of the associated primes.) Therefore, one has

$$H_{C_G(A,c)}(c) \hookrightarrow \left(H_{C_G(A,c)}(c)\right)_{\mathfrak{p}^C}.$$

As shown in the proof of 3.7, $(H_{C_G(A,c)}(c))_{\mathfrak{p}^C} = (H_{C_G(A,c)}(c))_{\mathfrak{p}}$ so that

$$\begin{aligned}
\mathfrak{g}_{(A,c)} &= \ker\left(H_G(X) \to H_{C_G(A,c)}(c)\right) \\
&= \ker\left(H_G(X) \to \left(H_{C_G(A,c)}(c)\right)_{\mathfrak{p}^C}\right) \\
&= \ker\left(H_G(X) \to \left(H_{C_G(A,c)}(c)\right)_{\mathfrak{p}}\right) \\
&= \ker\left(H_G(X) \to \left(H_{C_G(A,c)}(c)\right)_{\mathfrak{p}}^{W_G(A,c)}\right).
\end{aligned}$$

By Theorem 3.2, this last ideal equals $\ker(H_G(X) \to H_G(X)_{\mathfrak{p}})$.

Now, from commutative algebra one knows that $\mathfrak{g}$ is an isolated primary component belonging to the minimal prime $\mathfrak{p}$ in a commutative ring R if and only if

$$\mathfrak{q} = \ker\left(R \to R_{\mathfrak{p}}\right). \quad \text{Q.E.D.}$$

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It is easy to see that the first sentence of the original "proof" of Theorem 3.8 is not true; in general, there are many ideals in a commutative ring R that are primary for a single minimal prime $\mathfrak{p}$. For example, $\mathfrak{p}$ is primary for $\mathfrak{p}$, and so is the isolated primary component for $\mathfrak{p}$; of course, these need not be the same.

I would like to think Peter Landweber for pointing out this error and for his version of the above proof.

REFERENCES

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2. ______, *Depth and equivariant cohomology*, Comment. Math. Helv. **56** (1981), 627–637.

3. D. G. Quillen, *The spectrum of an equivariant cohomology ring*, I, II, Ann. of Math. (2) **94** (1971), 549–602.

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