A theorem about Frobenius $n-$homomorphisms

V.M. Buchstaber and E.G.Rees

November 22, 2004

We prove a theorem that should have been included in a previous paper [BR].

Theorem

Let A, B be finitely generated, associative, commutative $\mathbb{C}-$algebras with $f : A \to B$ and $g : B \to \mathbb{C}$ respectively being Frobenius n and m-homomorphisms, then $gf : A \to \mathbb{C}$ is a Frobenius nm-homomorphism.

Proof

Since $f(1) = n$ and $g(1) = m$ one has $gf(1) = nm$. It is trivial to check that the theorem is true for $m = 1$. By Theorem 3.4 of [BR], g is the sum of m ring homomorphisms, say $g = g_1 + g_2 + ... + g_m$ and so $gf = g_1 f + ... + g_m f$. By the remark above, each $g_k f$ is a Frobenius n-homomorphism and hence by Theorem 2.9 of [BR] their sum is a Frobenius $nm-$homomorphism.

References

[BR] V. M. Buchstaber and E. G. Rees, The Gelfand map and symmetric products, *Selecta Mathematica* **8** (2002), 523-535.