1035-20-498   **Eddy Campbell**, **R J Shank** and **David L Wehlau*** (`wehlau@rmc.ca`), Department of
Mathematics & Computer Science, Royal Military College of Canada, Kingston, Ontario K7K 7B4,
Canada. *A Proof of The First Main Theorem for the Two Dimensional Modular Representation of*
C_p. Preliminary report.

In 1997, Campbell and Hughes proved the First Main Theorem for the two dimensional modular representation of C_p. In other words, consider the cyclic group of order p and its indecomposable two dimensional representation V_2 over a field of characteristic p. The action of C_p on $m\,V_2 := V_2 \oplus \ldots \oplus V_2$ naturally induces an action of C_p on the symmetric algebra $S^*(m\,V_2)$. Campbell and Hughes gave generators for the ring of invariants of this representation. Their proof confirmed the conjecture David Richman had made concerning what the generators would be. The proof itself is somewhat difficult and relies upon a deep result of Wilson concerning the rank of 0-1 matrices in characteristic p.

I will describe a new proof of this result. This new proof, which enjoys a number of advantages, yields an explicit and easily computable description of the C_p-module structure of $S^*(m\,V_2)$, and provides a SAGBI basis for the ring of invariants, which promises a number of useful applications. Furthermore the new proof is simpler and in particular avoids the use of Wilson's theorem. The proof introduces and uses a connection between certain lattice paths (Dyck paths) and the Green ring of C_p. (Received September 10, 2007)