

Abstract: Recently two new resonance identities on closed characteristics on every compact star-shaped hypersurface  $\Sigma$  in  $R^{2n}$  are proved, when the number of geometrically distinct closed characteristics on  $\Sigma$  is finite. These identities extend those of C. Viterbo on the non-degenerate case in 1989, and that of W. Wang, X. Hu and Y. Long on convex case in 2007. Based on these new identities, and the index iteration theory, the existence of at least 2 geometrically distinct closed characteristics on every symmetric compact star-shaped hypersurface in  $R^4$  is proved. This is a joint work with Hui Lui and Wei Wang.