

Guo, Victor J. W.; Han, Fei

On certain multi-variable rational identities derived from the rigidity of signature of manifolds. (English) [Zbl 1379.57041](#)

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Summary: *R. Song* [*Sci. China, Ser. A* 48, No. 12, 1637–1645 (2005; [Zbl 1217.58015](#))] derives certain multi-variable rational identities by studying torus actions on some homogeneous manifolds and applying the Atiyah-Bott-Segal-Singer Lefschetz fixed point theorem. In this paper, we give a direct proof of these rational identities by using the q -Lucas theorem. Moreover, we also give a similar new rational identity.

MSC:

- [57S15](#) Compact Lie groups of differentiable transformations
- [58J26](#) Elliptic genera
- [58J20](#) Index theory and related fixed-point theorems on manifolds
- [11F27](#) Theta series; Weil representation; theta correspondences
- [05A19](#) Combinatorial identities, bijective combinatorics

Keywords:

signature; rigidity; fixed point theorem; q -Lucas theorem; theta function; identities

Full Text: [DOI](#)

References:

- [1] Andrews, G. E., *The theory of partitions*, (1998), Cambridge University Press Cambridge · [Zbl 0906.05004](#)
- [2] Atiyah, M. F.; Bott, R., A Lefschetz fixed point formula for elliptic complexes II, *Ann. of Math.*, 37, 451-491, (1968) · [Zbl 0167.21703](#)
- [3] Atiyah, M. F.; Singer, I. M., The index of elliptic operators II, *Ann. of Math.*, 87, 546-604, (1968) · [Zbl 0164.24301](#)
- [4] Bott, R.; Taubes, C., On the rigidity theorems of Witten, *J. Amer. Math. Soc.*, 2, 137-186, (1989) · [Zbl 0667.57009](#)
- [5] Connolly, F.; Nagano, T., The intersection pairing on a homogeneous Kähler manifold, *Michigan Math. J.*, 24, 33-39, (1977) · [Zbl 0378.53029](#)
- [6] Désarménien, J., Un analogue des congruences de Kummer pour les q -nombres d'Euler, *European J. Combin.*, 3, 19-28, (1982) · [Zbl 0485.05006](#)
- [7] Guo, V. J.W.; Zeng, J., Some arithmetic properties of the q -Euler numbers and q -salié numbers, *European J. Combin.*, 27, 884-895, (2006) · [Zbl 1111.05009](#)
- [8] Hirzebruch, F., *Topological methods in algebraic geometry*, (1966), Springer-Verlag Berlin, Heidelberg, New York · [Zbl 0138.42001](#)
- [9] Hirzebruch, F.; Slodowy, P., Elliptic genera, involutions, and homogeneous spin manifolds, *Geom. Dedicata*, 35, 309-343, (1990) · [Zbl 0712.57010](#)
- [10] Liu, K., On elliptic genera and theta-functions, *Topology*, 35, 617-640, (1996) · [Zbl 0858.57034](#)
- [11] Olive, G., Generalized powers, *Amer. Math. Monthly*, 72, 619-627, (1965) · [Zbl 0215.07003](#)
- [12] Shanahan, P., On the signature of Grassmannians, *Pacific J. Math.*, 84, 483-490, (1979) · [Zbl 0392.55012](#)
- [13] Song, R., Elliptic genera of homogeneous spin manifolds and theta functions identities, *Sci. China Ser. A*, 48, 1637-1645, (2005) · [Zbl 1217.58015](#)
- [14] Taubes, C. H., S^1 actions and elliptic genera, *Comm. Math. Phys.*, 122, 455-526, (1989) · [Zbl 0683.58043](#)
- [15] Thom, R., Espaces fibrés en sphères et carrés de Steenrod, *Ann. Sci. Éc. Norm. Supér.*, 69, 109-182, (1952) · [Zbl 0049.40001](#)

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