Helicity Patterns of the Active Regions Connected by Transequatorial Loops

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Using a 1991-2001 data set of original photospheric vector magnetogrames from the Solar Magnetic Field Telescope (SMFT) of the Huairou Solar Observing Station in Beijing and *Yohkoh* SXT images, we calculate the helicity patterns of 47 pairs of active regions and the chiralities of opposite magnetic polarities which are connected by the transequatorial loops (TLs) using two parameters including the local current helicity $B_z \cdot (\bigtriangledown \times \mathbf{B})_z$ and the force-free factor α_{best}. The results are similar from both two parameters, it is found that: (1) Not similar to the result of Pevtsov (2000) that the transequatorial loops connected regions tend to have the same handedness, the helicity patterns of these pairs of active regions have no obvious regularity: about 50% of the active regions pairs have the same chirality. (2) The hemispheric rule of these active regions is weak, only a little more than 50% have negative helicity in the norhern hemisphere, about 65% have the positive helicity in the southern hemisphere. (3) About 60% of the magnetic polarity pairs connected by the TLs have the same chiralities. In other words, the opposite magnetic polarities regions connected by the TLs have the larger possibilities to have the same helicity patterns than the active regions.