Free boundary ballooning mode representation[1] LINJIN ZHENG,
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Considerable efforts have been made in this field to develop a free boundary balloon-
ing mode representation, which can incorporate the peeling mode stability criterion.
Those efforts have not succeeded, simply because the so-called ballooning mode in-
variance is broken toward plasma edge. This makes 1D description of high n modes
at plasma edge become impossible, where n is toroidal mode number. Nevertheless,
we prove that the existence of "half" ballooning mode invariance toward plasma
core enables an $1.\delta$-dimentional representation of the modes, where $\delta \sim \mathcal{O}(1/n)$.
This considerably reduces the complicity in investigating high n modes at plasma
edge and can be used to study peeling-ballooning modes. This technique can also
be useful to extend the 1D calculation of fixed boundary ballooning modes for free
boundary ballooning modes. Numerical example will also be presented together with
the topological symmetry analysis.

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