Balanced vertex decomposable simplicial complexes and their h-vectors

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Given any finite simplicial complex Δ , we will discuss how to construct a simplicial complex Δ_{χ} that is balanced and vertex decomposable. This new simplicial complex has the property that *h*-vector of the simplicial complex Δ_{χ} is precisely the *f*-vector of the original complex Δ . This construction generalizes the "whiskering" construction of Villarreal, and Cook and Nagel. As an application, we will show how to use this construction to construct a square-free monomial ideal with a particular sequence of Betti numbers obtained from the *f*-vector of a simplicial complex.