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Many classical objects on a surface  $S$  can be interpreted as cross-ratio functions on the circle at infinity of the universal covering  $\tilde{S}$ . This includes closed curves considered up to homotopy, metrics of negative curvature considered up to isotopy and, in the case of interest here, tangent vectors to the Teichmüller space of complex structures on  $S$ . When two cross-ratio functions are sufficiently regular, they have a geometric intersection number, which generalizes the intersection number of two closed curves. In the case of the cross-ratio functions associated to tangent vectors to the Teichmüller space, we show that two such cross-ratio functions have a well-defined geometric intersection number, and that this intersection number is equal to the Weil-Petersson scalar product of the corresponding vectors. (Received July 22, 2010)