Pich and Santhanam [1] define a generalization of the feasible interpolation property for a propositional proof system $P$ as follows: $P$ has KPT interpolation if there is a constant $k$ and polynomial time computable functions $f_1, \ldots, f_k$, such that whenever $\pi$ is a $P$-proof of a disjunction

$$A_1(x, y_1) \lor \ldots \lor A_m(x, y_m)$$

where $x$ is an $n$-tuple of variables and the $y_j$ are disjoint tuples of variables, then for every $a \in \{0, 1\}^n$ one of the following holds:

- either $A_{i_1}(a, y_{i_1})$ is a tautology for $i_1 = f_1(a, \pi)$,
- or $A_{i_2}(a, y_{i_2})$ is a tautology for $i_2 = f_2(a, \pi, b_{i_1})$, for $b_{i_1}$ such that $A_{i_1}(a, b_{i_1})$ is false,
- \ldots
- or $A_{i_k}(a, y_{i_k})$ is a tautology for $i_2 = f_2(a, \pi, b_{i_1}, \ldots, b_{i_{k-1}})$, for $b_{i_{k-1}}$ such that $A_{i_{k-1}}(a, b_{i_{k-1}})$ is false.

The paper under review shows that sufficiently strong propositional proof systems do not have KPT interpolation, under a mild complexity assumption. The complexity assumption and the method of proof are similar to those used to show that strong proof systems do not have feasible interpolation.

References