Notes Röbel’s article :  
  
Phase vocoder can be considered a very efficient tool

for signal transformation that achieves high quality transformed

signals for weakly non stationary signals (slow varying variables). Abrupt changes in the

amplitude of a signal, however, will usually lead to considerable

artifacts and remain a challenge for phase vocoder applications.

If the

amplitude of a sinusoid changes abruptly, a situation normally denoted

as attack transient, the prerequisites of the phase correction

are no longer valid and consequently the results obtained with the

phase vocoder have poor quality. Time stretching attack transients

with the phase vocoder results in less severe cases in softening of

the perceived attack. (transient smearing already explained in Laroche) In more severe cases a complete change of

the sound characteristics may take place.

The main problem of the phase vocoder when processing attack

transients is the fact that the transient signal does not have a

predictable relation to the previous frames such that a reinitialization

of the phase spectrum is inevitable if the shape of the transient

signal shall be recreated. After reinitialization of the phase spectrum

two further problems require investigation. The phase slope

itself and its change with the window position as well as the change

in peak bandwidth are violating the assumptions that are made for

deriving the phase manipulations to be applied when time stretching

a signal with the phase vocoder.