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% Create a list of component combinations

function idx = getCombinations_band2( n, N, dn, fc, lowFreqCriterion, span )

% n = number of discrete signal components desired, e.g. 4
% N = number of contiguous bands where the n components may be, e.g. 13
% dn = minimum bands between components, e.g. 1
% span = the number of bands that the components should span, e.g. 9
%
% 4 components in 13 bands with a min of 1 band spacing and a span of 9
% bands will produce 185 combinations

v = 1 : N; % number of bands
idx = nchoosek( v, n ); % all possible combinations of pairs of bands (2 band test)

for ink = 1 : n - 1
    deltas = diff( idx' )'; % difference between bands in the pair
    idx = idx( deltas( :, ink ) >= dn + 1, : ); % remove pairs with a difference of 1 between bands
end

%find(X,K,'last') returns at most the last K indices corresponding to the nonzero entries of the array X.
%finding the last freq equal to or below 1000Hz
idxCrit = find( fc <= lowFreqCriterion, 1, 'last' );

idx = idx( idx( :, 1 ) < idxCrit, : ); % first column of idx that is less than 1000 Hz (index 6)
idx = idx( idx( :, 2 ) >= idxCrit, : ); % second column if idx that is greater than or equal to 1000 Hz

deltas = idx( :, end ) - idx( :, 1 ); % difference between bands in the pair
idx = idx( deltas( :, 1 ) >= span - 1, : ); % removing pairs that don't meet the min span
```