

# How to make real bases complex?

Florian Heinrich

Every pair of real, continuous wavelets  $\psi_1, \psi_2$  can be converted to a complex, continuous wavelet  $\psi_1 + i\psi_2$ . We ask an analogous question for orthonormal bases and Riesz bases and show under which conditions two real orthonormal bases or Riesz bases can be converted to a complex orthonormal basis or Riesz basis, respectively. We approach this problem by converting the problem into an equivalent problem on operators and classify them. As an example, we apply the result to orthonormal wavelet bases.