DNS of mixing in spatially developing shear layers ANTONIO AT-
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The majority of models proposed for turbulent combustion rely on the knowledge of
the mixture fraction Z, its pdf, the scalar dissipation, and, in some cases, a mixing
time scale. Turbulent mixing in technical devices is almost always inhomogeneous
and the flow regime is transitional so that spatially developing mixing layers are
highly relevant. DNS have been performed for a Reynolds number up to 2×10^4,
enough to identify mixing transition. All relevant statistics and their dependence
on Reynolds number have been analyzed. Previous results show that the scalar pdf
can be: *non-marching*, when the most probable value of the mixture fraction of
mixed fluid is invariant across the width of the layer; *marching*, for which the most
probable value is the mean mixture fraction at the location considered. The pdf
behavior is discussed in several previous works and it has been found to be related
to the Reynolds number and the level of turbulence development. The DNS results
we present clearly show that the pdf evolves from *non-marching* to *marching* during
the streamwise evolution of the scalar field.

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