Non-chiral Bosonization of Fermions in One Dimension[1] GIRISH
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nology Guwahati 781039, India — An alternative to the conventional approach to
bosonization in one dimension that invokes the Dirac equation in 1+1 dimension
with chiral "right-movers" and "left-movers" is proposed that works directly with
the bounded parabolic energy bands relevant to Condensed Matter problems. This
technique allows us to use a basis different from the plane wave basis that makes this
non-chiral approach ideally suited to study Luttinger liquids that have boundary or
impurities that break translational symmetry. We provide a simple solution to the
electron Green function for the problem of Luttinger liquid (LL) with a boundary
and also for a LL with a single impurity. The present method is significantly easier
than the g-ology based standard bosonization and other methods that require a com-
bination of RG along with bosonization/refermionization techniques. Our results are
broadly consistent with these more established approaches.

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