# Unitary equivalence of nonunital representations

`MathlibAnnex.Analysis.CStarAlgebra.NonUnitalCStarRepresentation.UnitaryEquivalent`

Defines unitary equivalence by an onto complex-linear isometry intertwining the two representations.

## Statement

Let A be a complex C*-algebra, not assumed unital; let π and ρ be representations of A on complex Hilbert spaces H and K, respectively. They are unitarily equivalent when an onto complex-linear isometry U from H to K intertwines every represented operator at every vector.

## Definition

UnitaryEquivalent π ρ ↔ ∃ U : H ≃ₗᵢ[ℂ] K, ∀ a x, U (π a x) = ρ a (U x).

## Assumptions

Let A be a complex C*-algebra, not assumed unital; let π and ρ be representations of A on complex Hilbert spaces H and K, respectively.

## Conclusion

They are unitarily equivalent when an onto complex-linear isometry U from H to K intertwines every represented operator at every vector.

## Main citations

MathlibAnnex.Analysis.CStarAlgebra.NonUnitalCStarRepresentation

Exact formal dependency; inspect the linked Card and exact source.

## Lean source signature (exact)

```
def UnitaryEquivalent (pi : NonUnitalCStarRepresentation A H)
(rho : NonUnitalCStarRepresentation A K) : Prop
```

Read exact MathlibAnnex v0.4.0 source

## Exact Card identity

Stable Card ID: caeef92045d974a18cb5eb41cd4c36b68c457337d1569671d296e8f3c437fec6

Card SHA-256: a8e25386a77ea847a8782daf3e66b3684a80f4986143acac07d0377f2fbd2dff

Approved exposition SHA-256: 69547e5c774af471980f5a45f7594ac7a37320091897bf083acb383a97f9053c

AI-assisted material. Selected, edited, and reviewed by Ryotaro Tanaka. The recorded review is source–exposition correspondence, not an independent proof audit.