Step 1

Research background

Central role of macroeconomic forecasting

monetary policy formulation
fiscal planning
risk management

Real-world challenges

- *Structural breaks*
- *Institutional transitions*
- *Cross-country heterogeneity*

Existing methods & limitations

Traditional econometric models
↓
overly strong linear assumptions (VAR / DSGE)

Deep learning models
↓
long-cycle drift / lack of interpretability (LSTM / TFT)

Core contradiction

Needs to be satisfied simultaneously:

flexibility + *stability* + *interpretability*

Step 2

Problem identification

Unconstrained latent representations

Across time steps changes

Network depth increase

Forecast horizon extension

Representation drift

Direct consequences

unstable attention patterns

unreliable long-horizon forecasts

Step 3

Model

Quantum-inspired: unitary transformation structure
Unitary evolution preserving norm and inner products

QTFT Structure

TFT basic + Unitary transformation layer

Mathematical constraints: $\boldsymbol{U}^{\mathrm{T}}\boldsymbol{U} = \boldsymbol{I}$

Norm preservation guarantee: $\|\tilde{\boldsymbol{z}}\|_2 = \|\boldsymbol{z}\|_2$

III. Temporal attention

★ II. Unitary latent transformation

I. Variable selection network

Key design principles

Constraining representation geometry rather than model capacity

Preserving expressive capacity

Enhancing stability