

Affine quantisation of the Brans-Dicke theory

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- **Brans-Dicke theory:** non-minimal coupling between scalar field/gravity (Jordan frame):

$$\mathcal{L}_G = \sqrt{-g} \left\{ \varphi R - \omega \frac{\varphi_{; \rho} \varphi^{; \rho}}{\varphi} \right\}$$

Minimal coupling obtained by conformal transformation (Einstein Frame). Classically equivalent, but quantum equivalence still under debate.

- **Affine quantisation** best for positive variables, e.g. scalar field or scale factor. Fewer constraints than other quantisations, unique quantum operator, possesses regularisation terms.

The quantum equivalence between frames depends only on a condition over arbitrary vectors.