

On the possibility of
Braneworld Quintessential
Inflation

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with Prof. Andrew Liddle
arXiv:1002.3730

The modified cosmology

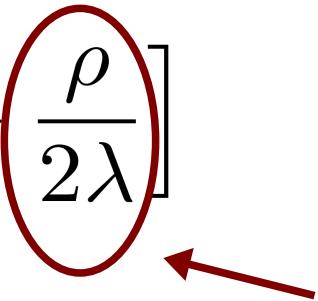
- Friedmann equation for the brane:

$$H^2 = \frac{8\pi}{3m_4^2}\rho \left[1 + \frac{\rho}{2\lambda} \right] + \frac{\Lambda_4}{3} + \frac{\epsilon}{a^4}$$

The diagram illustrates the components of the Friedmann equation. It shows the equation $H^2 = \frac{8\pi}{3m_4^2}\rho \left[1 + \frac{\rho}{2\lambda} \right] + \frac{\Lambda_4}{3} + \frac{\epsilon}{a^4}$ with four red arrows pointing from labels below to specific terms above them. The first arrow points to $\frac{8\pi}{3m_4^2}\rho$ and is labeled "4-D Planck mass". The second arrow points to $\frac{\rho}{2\lambda}$ and is labeled "Brane tension". The third arrow points to $\frac{\Lambda_4}{3}$ and is labeled "Cosmological constant from intrinsic tension". The fourth arrow points to $\frac{\epsilon}{a^4}$ and is labeled "Bulk gravitons".

The modified cosmology

- Friedmann equation for the brane:

$$H^2 = \frac{8\pi}{3m_4^2} \rho \left[1 + \frac{\rho}{2\lambda} \right]$$


Friction term

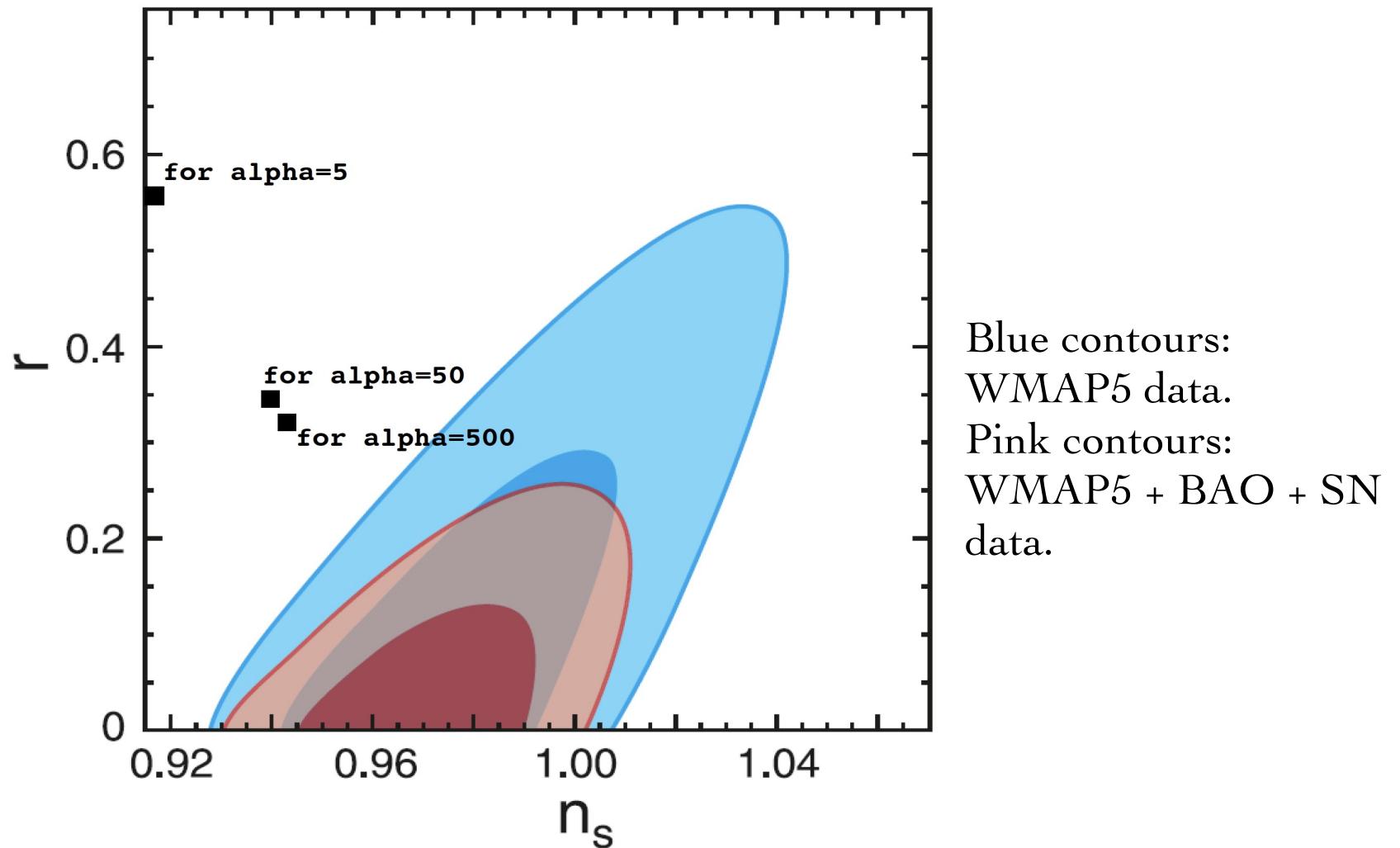
- The scalar field confined to the brane:

$$\ddot{\phi} + 3H\dot{\phi} = -\frac{dV}{d\phi}$$

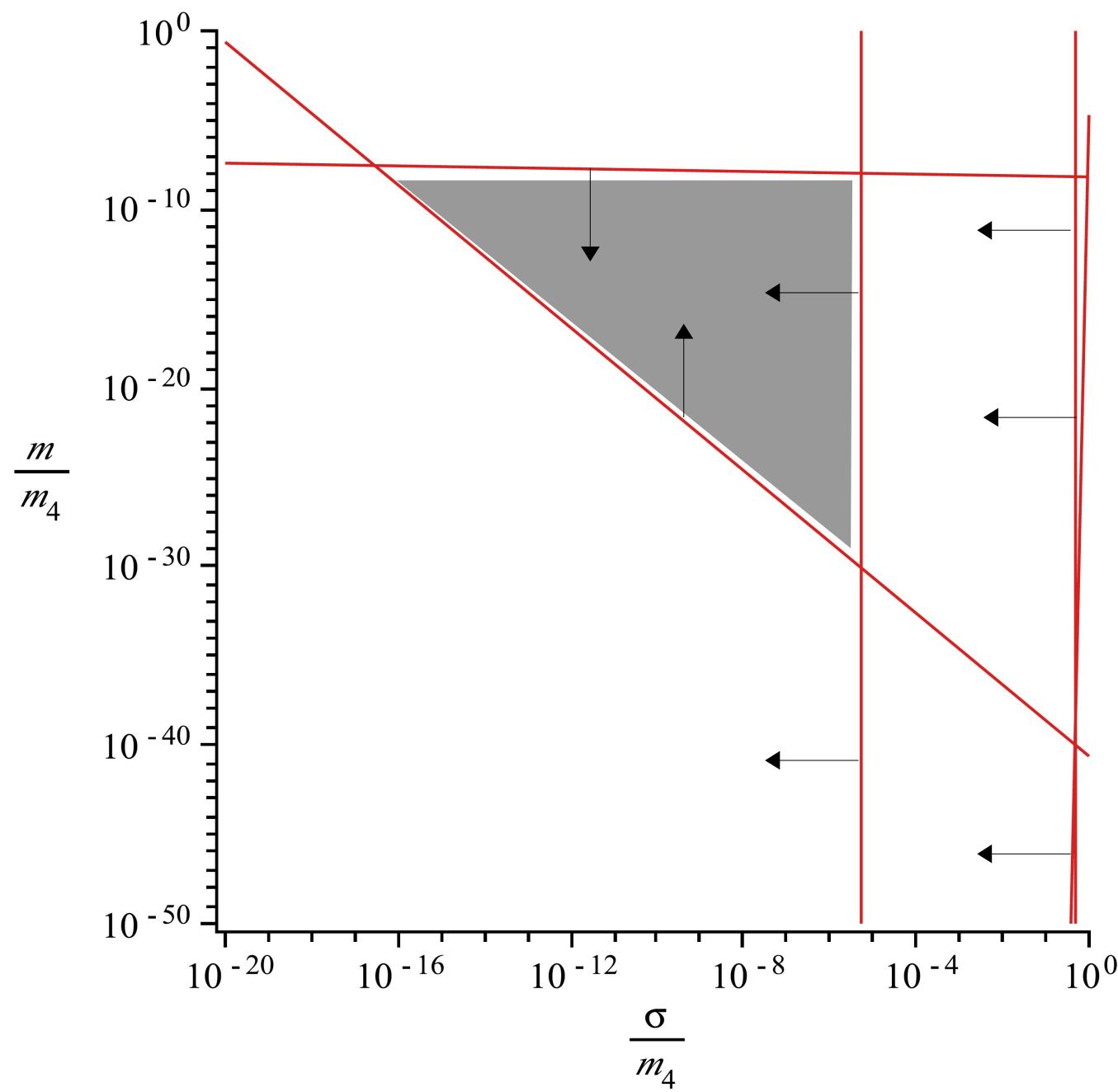
Inflation

$$V = V_0 \exp(-\alpha\phi/m_4)$$

$$V = V_0 \left(\frac{\phi}{m_4}\right)^{-\alpha}$$

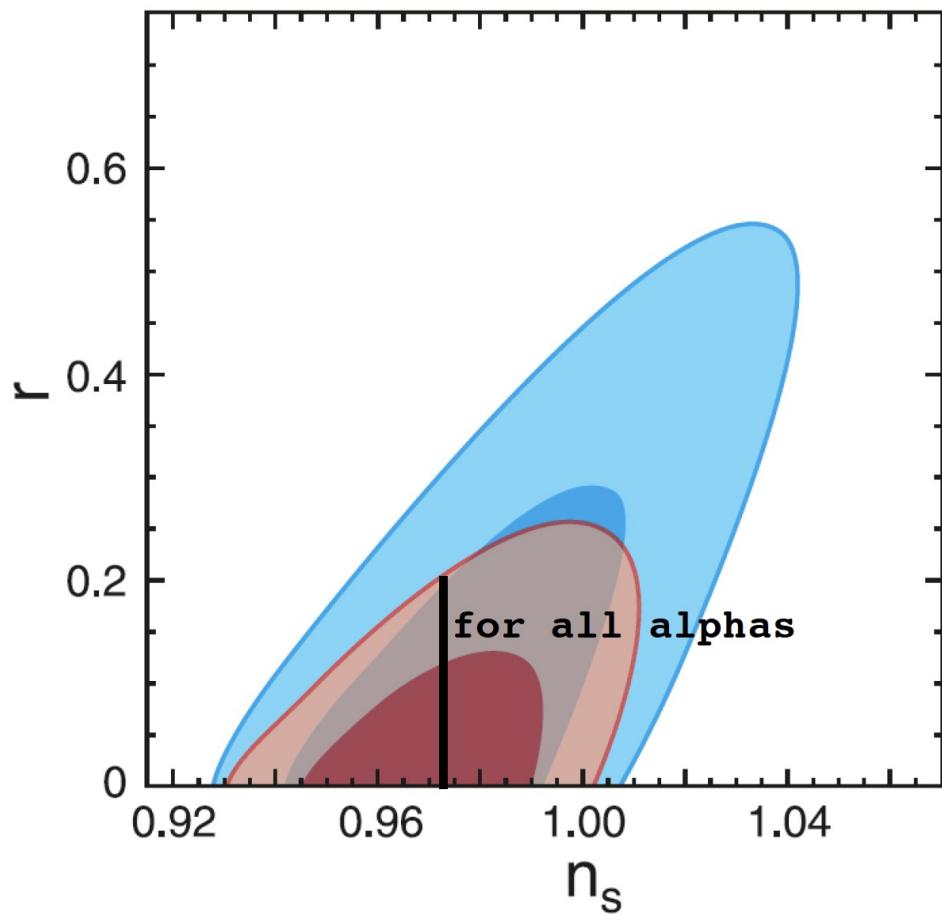


Inflation

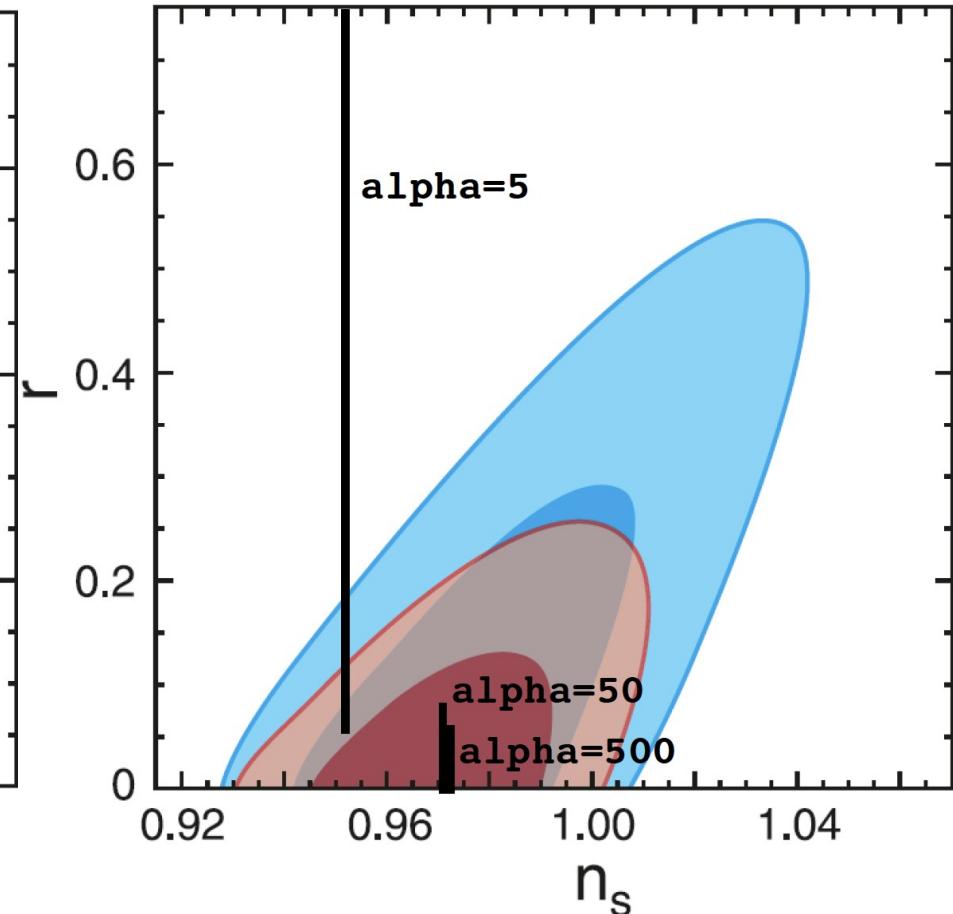


Inflation

Exponential potential

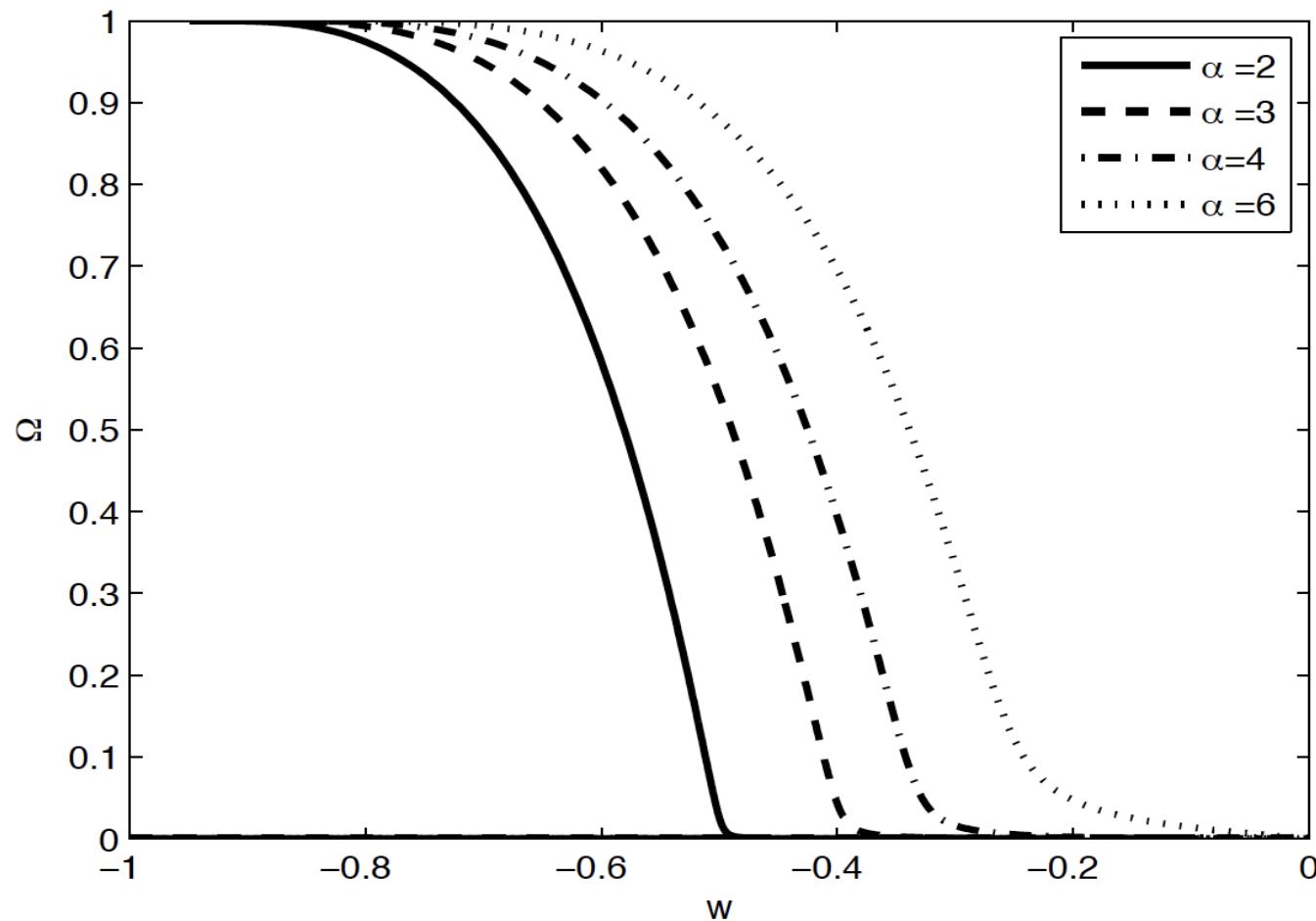


Inverse power law potential



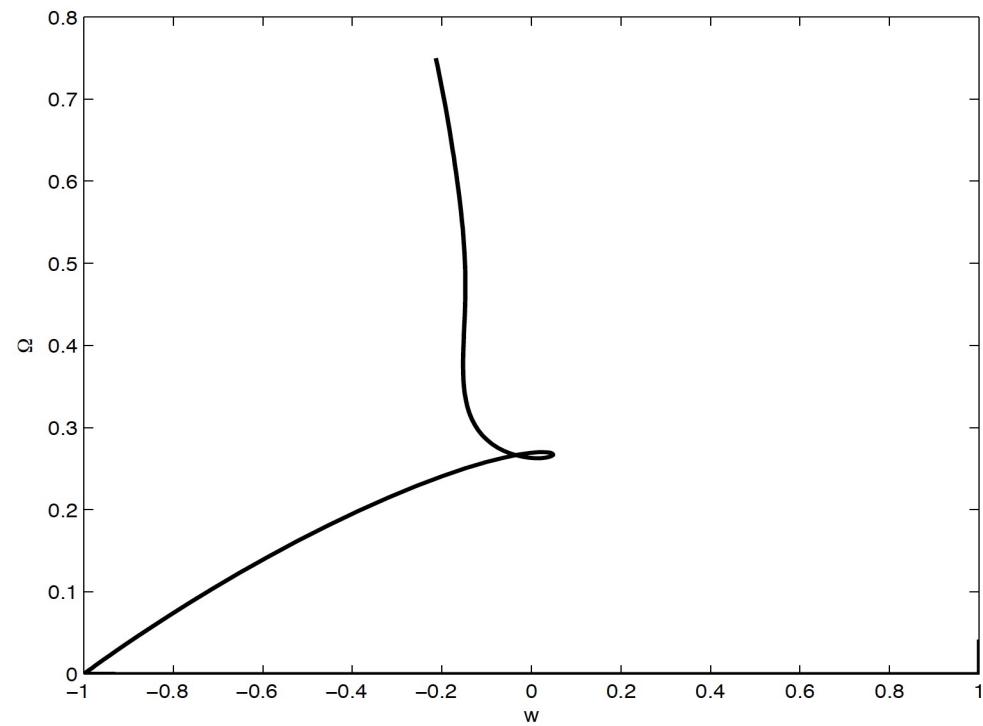
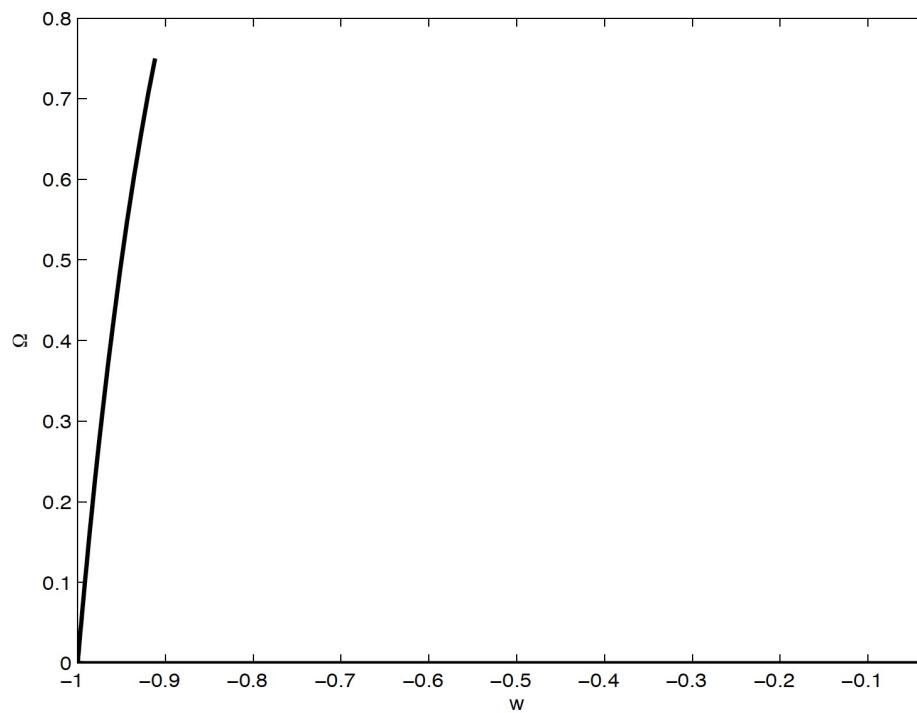
Quintessence

- Tracking Solution



Quintessence

- Thawing Solution



Conclusions

