n	AdS case	CM case
0	2.83	2.16
1	4.90	4.85
2	6.93	7.05
3	8.94	9.20
4	11.0	11.3

Table 4.3: Vector meson spectrum comparing CM and pure AdS backgrounds

no $SO(4)$ R-charge. We write the gauge field as

$$A^\mu = g(\rho)\sin(kx)\epsilon^\mu \tag{4.28}$$

The resulting Euler-Lagrange equation of motion is then

$$\begin{aligned} & e^\phi \mathcal{G}\sqrt{1+(\partial_\rho\sigma_0)^2}M^2R^2 g(\rho) H\left(\frac{\omega^4-1}{\omega^4+1}\right)^{\frac{1}{4}} \\ + \quad & \partial_\rho\left(\frac{e^\phi\mathcal{G}}{\sqrt{1+(\partial_\rho\sigma_0)^2}}\partial_\rho g(\rho)\frac{\omega^4}{\sqrt{(\omega^4-1)(\omega^4+1)}}\right) = 0 \end{aligned} \tag{4.29}$$

There are two asymptotic solutions to equation (4.29). The simplest is $M = 0$, $g(\rho) =$ constant. This corresponds to introducing a background gauge field associated with $U(1)$ baryon number in the field theory. It is of little interest to us here.

The second solution is $g(\rho) \sim 1/\rho^2$, and this has the right dimension and symmetries to be identified as dual to the operator $\bar{q}\gamma^\mu q$. By seeking smooth solutions to the equation of motion we can determine the vector mass spectrum. The results are shown in table 4.3, and compared to the equivalent result in the pure $AdS_5 \times S^5$ spacetime, which we calculated in section 3.2.2.