In[1]:=
```
DSolve[r * R''[r] + 2 * R'[r] + 2 * (E * r + 1) * R[r] == 0, R[r], r]
```

Out[1]=

$$\left\{\left\{R[r] \to e^{-i \sqrt{2 e}\, r}\, c_2\, \text{Hypergeometric1F1}\left[1 + \frac{i}{\sqrt{2 e}}, 2, 2 i \sqrt{2 e}\, r\right] + e^{-i \sqrt{2 e}\, r}\, c_1\, \text{HypergeometricU}\left[1 + \frac{i}{\sqrt{2 e}}, 2, 2 i \sqrt{2 e}\, r\right]\right\}\right\}$$

In[8]:=
```
bwb[r_, e_] = Exp[-I * Sqrt[2 * e] * r] * Hypergeometric1F1[1 + I / Sqrt[2 * e], 2, 2 * I * Sqrt[2 * e] * r]
```

Out[8]=

$$e^{-i \sqrt{2}\, \sqrt{e}\, r}\, \text{Hypergeometric1F1}\left[1 + \frac{i}{\sqrt{2}\, \sqrt{e}}, 2, 2 i \sqrt{2}\, \sqrt{e}\, r\right]$$

In[14]:=
```
MatrixForm[Table[{e, bwb[r, e], Limit[bwb[r, e], r → Infinity]}, {e, -1, -1/8, 1/8}]]
```

Out[14]//MatrixForm=

$$\begin{pmatrix} -1 & e^{\sqrt{2}\, r}\, \text{Hypergeometric1F1}\left[1 + \frac{1}{\sqrt{2}}, 2, -2 \sqrt{2}\, r\right] & \infty \\ -\frac{7}{8} & e^{\frac{\sqrt{7}\, r}{2}}\, \text{Hypergeometric1F1}\left[1 + \frac{2}{\sqrt{7}}, 2, -\sqrt{7}\, r\right] & \infty \\ -\frac{3}{4} & e^{\sqrt{\frac{3}{2}}\, r}\, \text{Hypergeometric1F1}\left[1 + \sqrt{\frac{2}{3}}, 2, -\sqrt{6}\, r\right] & \infty \\ -\frac{5}{8} & e^{\frac{\sqrt{5}\, r}{2}}\, \text{Hypergeometric1F1}\left[1 + \frac{2}{\sqrt{5}}, 2, -\sqrt{5}\, r\right] & \infty \\ -\frac{1}{2} & e^{-r} & 0 \\ -\frac{3}{8} & e^{\frac{\sqrt{3}\, r}{2}}\, \text{Hypergeometric1F1}\left[1 + \frac{2}{\sqrt{3}}, 2, -\sqrt{3}\, r\right] & -\infty \\ -\frac{1}{4} & e^{\frac{r}{\sqrt{2}}}\, \text{Hypergeometric1F1}\left[1 + \sqrt{2}, 2, -\sqrt{2}\, r\right] & -\infty \\ -\frac{1}{8} & e^{-r/2} \left(1 - \frac{r}{2}\right) & 0 \end{pmatrix}$$

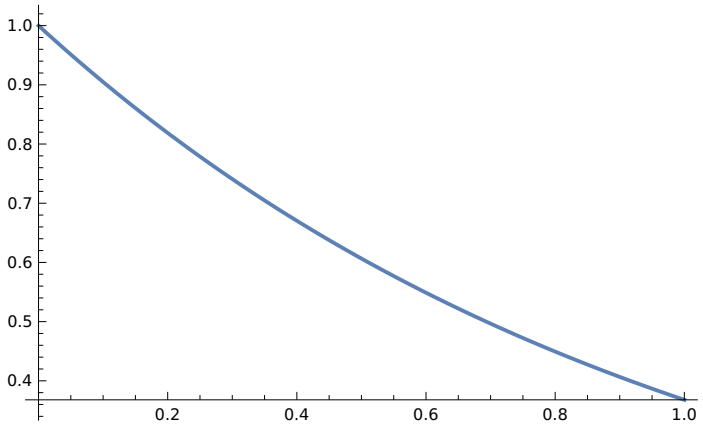
In[15]:=
```
FunctionDomain[bwb[r, e], {r, e}, Complexes]
```

Out[15]=

$$e \neq 0$$

In[26]:=
```
Plot[bwb[r, -1 / 2], {r, 0, 1}]
```

Out[26]=



In[32]:=
```
Plot[bwb[r, -1 / 4], {r, 0, 100}]
```

Out[32]=