Special Problem 6.2-1

For the differential amplifier below, the DC bias voltage $V_{BB}$ is set so that each BJT is in the active region.

The BJTs are identical, with $\beta = 100$.

Determine the small signal differential gain $A_d = \frac{v_{o1}}{v_d}$ of this amplifier, where $v_d = v_1 - v_2$. 

\[
\begin{align*}
V_{BB} + v_1(t) &\quad 1.25K \\
15V &\quad 8.0K \\
\beta = 100 &\quad 16.0K \\
\beta = 100 &\quad 8.0K \\
15V &\quad 1.25K \\
V_{BB} + v_2(t) &\quad 2.5K \\
-15V &\quad 2.5K
\end{align*}
\]