Let $\xi_{0.05}$ and $\xi_{0.95}$ denote the 5^{th} and 95^{th} percentiles of the distn of $\hat{\theta} - \theta$. Then

$$
\begin{aligned}
0.9 &= P(\xi_{0.05} < \hat{\theta} - \theta < \xi_{0.95}) \\
&= P(-\hat{\theta} + \xi_{0.05} < -\theta < -\hat{\theta} + \xi_{0.95}) \\
&= P(\hat{\theta} - \xi_{0.05} > \theta > \hat{\theta} - \xi_{0.95})
\end{aligned}
$$

gives us that

$$(\hat{\theta} - \xi_{0.95}, \; \hat{\theta} - \xi_{0.05})$$

is a 90% c.i. for θ.

Since $\xi_{0.05}$ and $\xi_{0.95}$ are unknown, in practice we can estimate them with estimates of the 5^{th} and 95^{th} percentiles of the bootstrap distn of $\hat{\theta}^* - \hat{\theta}$, which are

$$\hat{\theta}^{*(.05)} - \hat{\theta} \quad \& \quad \hat{\theta}^{*(.95)} - \hat{\theta}.$$

This gives us that an approximate 90% c.i. for θ is

$$
\begin{aligned}
&(\hat{\theta} - [\hat{\theta}^{*(.95)} - \hat{\theta}], \; \hat{\theta} - [\hat{\theta}^{*(.05)} - \hat{\theta}]) \\
&= (2\hat{\theta} - \hat{\theta}^{*(.95)}, \; 2\hat{\theta} - \hat{\theta}^{*(.05)}),
\end{aligned}
$$

which is equivalent to (13.9) on p. 174 of E&T.

(Note: The above is equivalent to solving Problem 13.5 on p. 177 of E&T, except I choose to use different notation.)