Procedure for drawing energy graphs

✓ Identify/draw the potential energy

- If gravitational interaction, then U_g and it's negative/attractive

- If electric interaction between opposite charges (+ −), then U_e and it's negative/attractive, and behaves the same way as U_g

- If electric interaction between like charges (+ + or − −), then U_e and it's positive/repulsive

✓ Identify/draw the total energy as a straight horizontal line

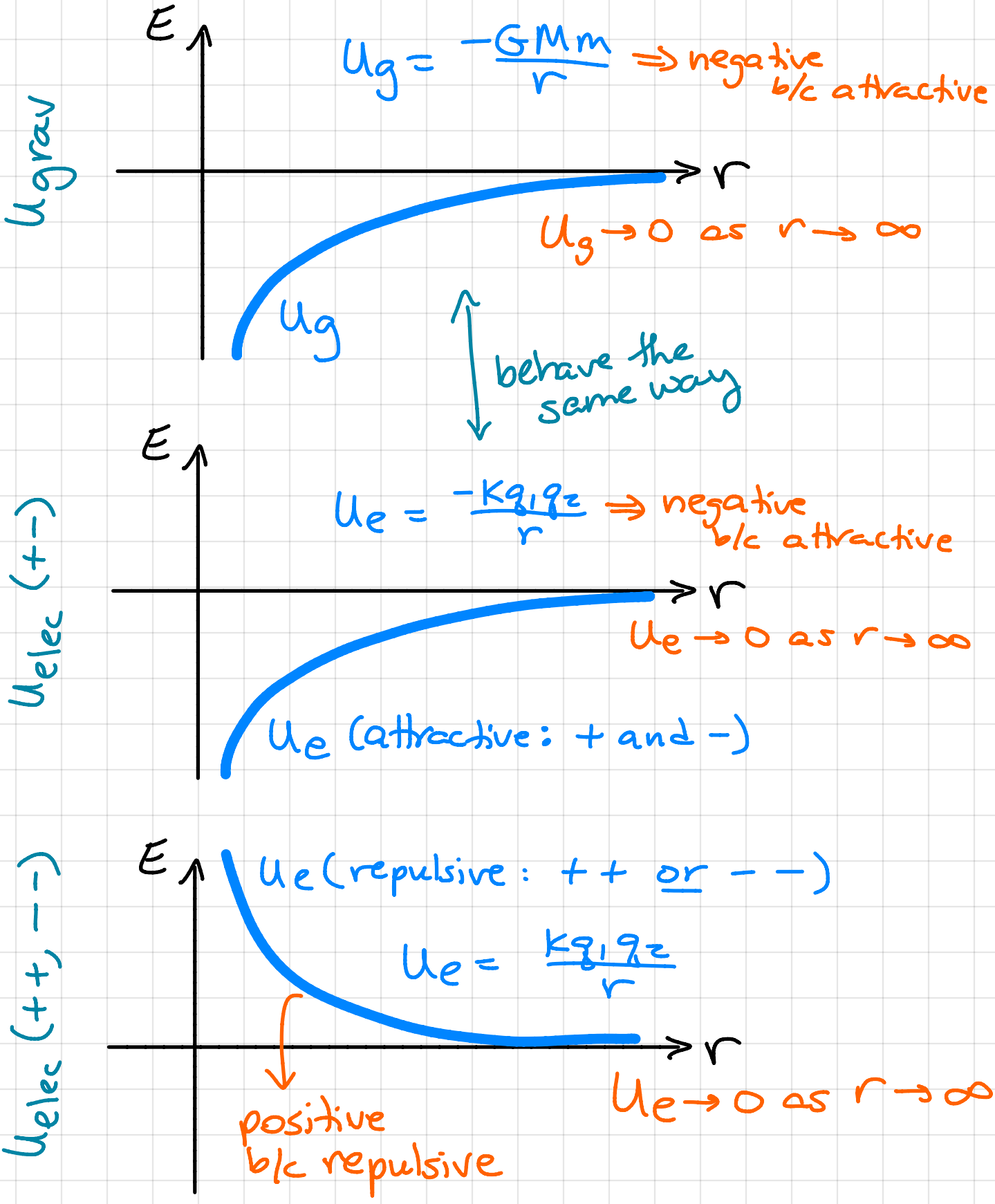
- $E > 0$ if system is unbound

- $E < 0$ if system is bound

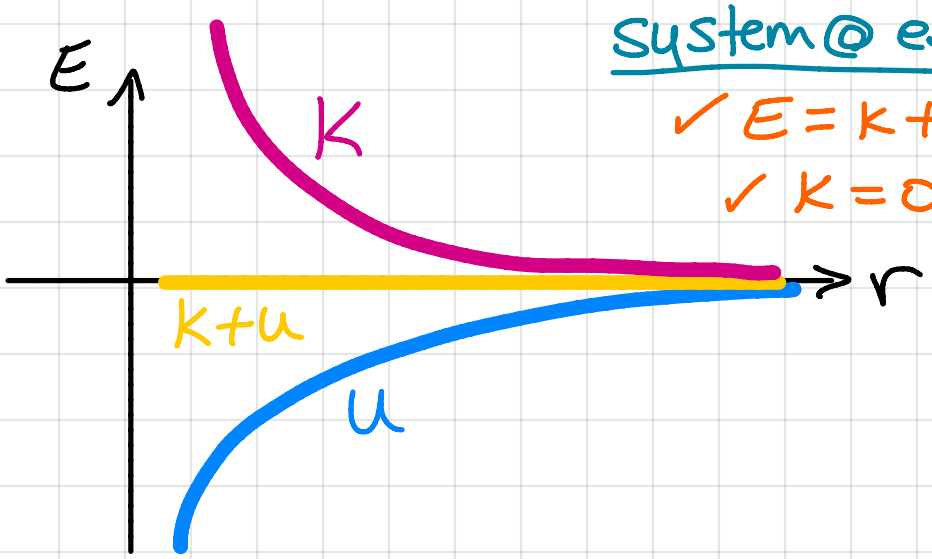
- $E = 0$ if system is at escape speed

✓ Draw the kinetic energy such that $K + U = E$ at every point in the graph.

Energy Graphs



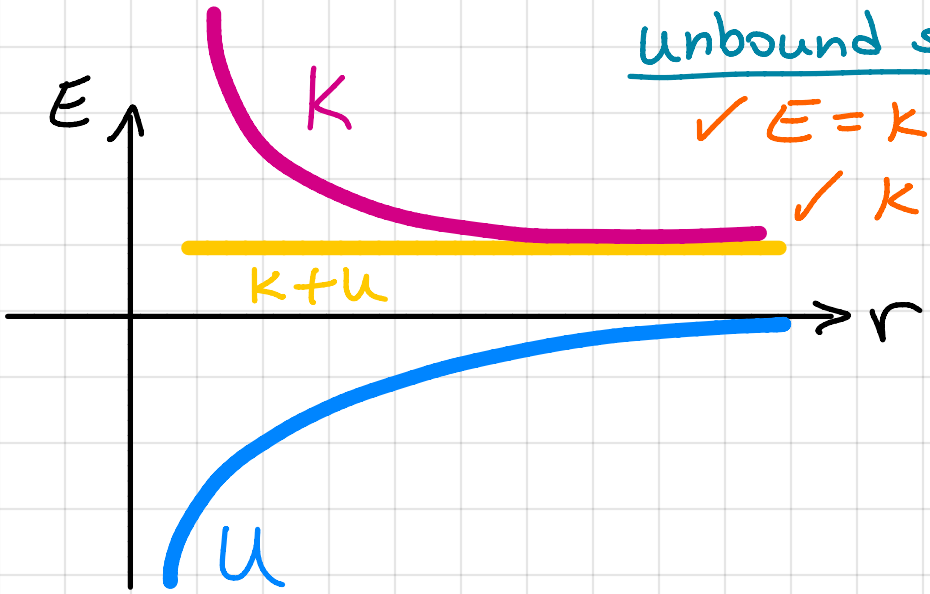
Energy Graphs



system @ escape speed

✓ $E = K + U = 0$

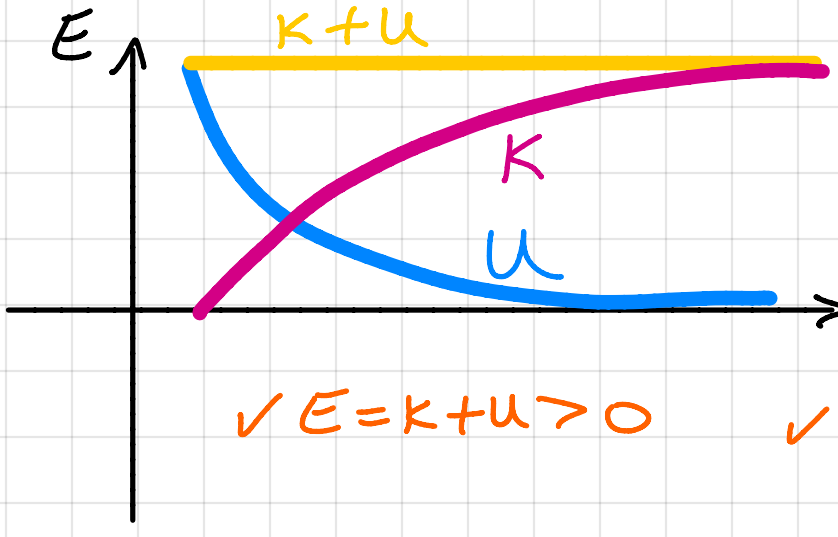
✓ $K = 0$ @ $r \to \infty$



unbound system

✓ $E = K + U > 0$

✓ $K \neq 0$ @ $r \to \infty$

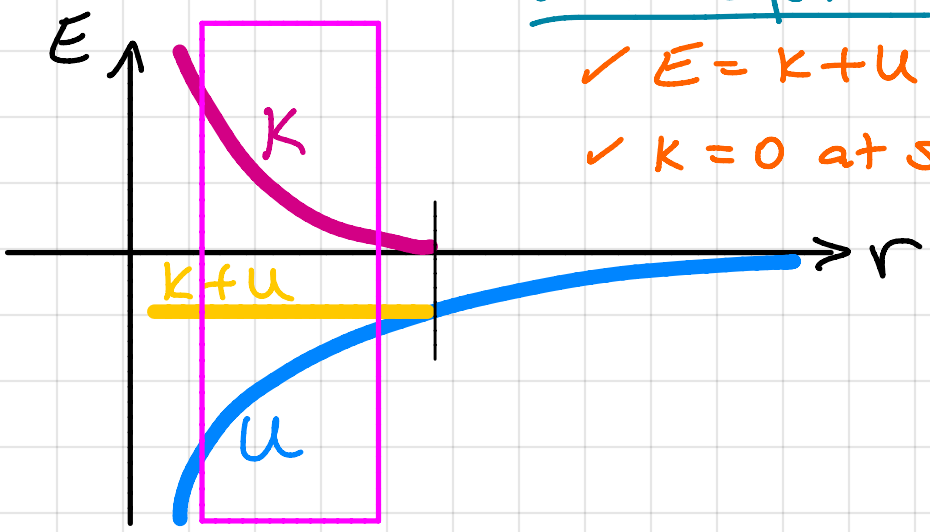


unbound repulsive system

✓ $E = K + U > 0$

✓ $K \neq 0$ @ $r \to \infty$

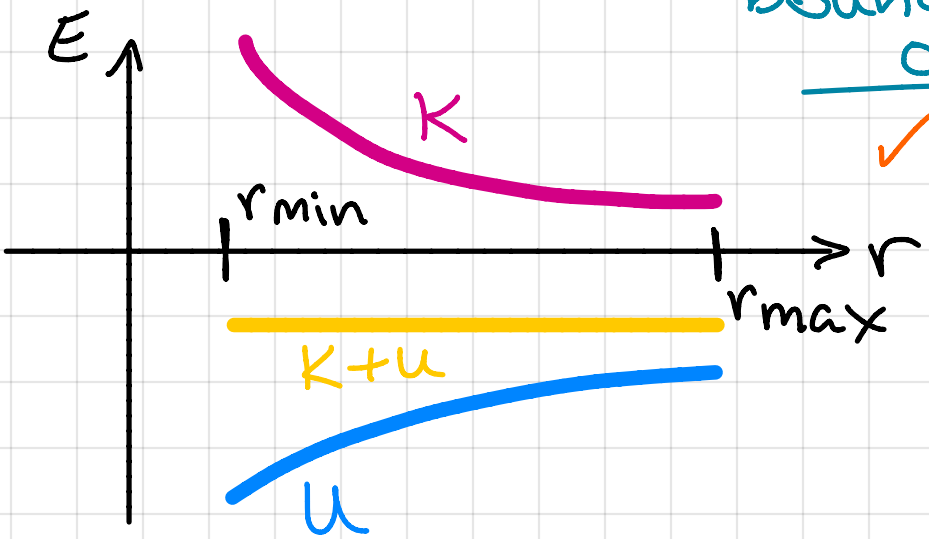
Energy Graphs



bound system

- ✓ $E = K + U < 0$
- ✓ $K = 0$ at some point

Zoom in



Special case of bound system: orbits

- ✓ $E = K + U < 0$
- ✓ $K \neq 0$
- ✓ motion is restricted between a minimum and maximum separation distance