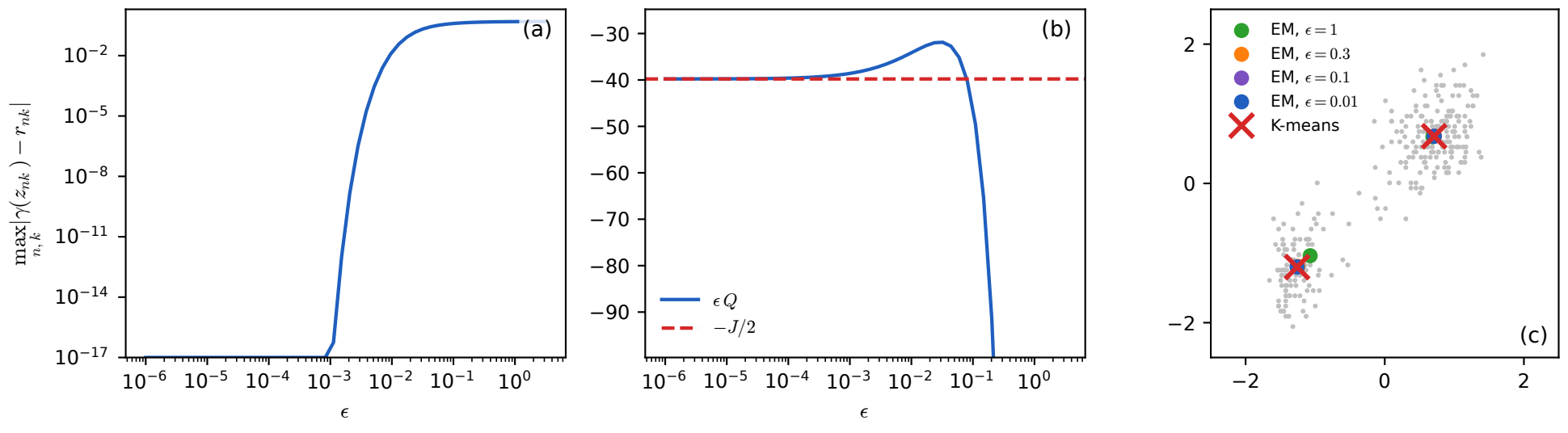

(a)
$\max_{n,k} |\gamma(z_{nk}) - r_{nk}|$
$10^{-2}$
$10^{-5}$
$10^{-8}$
$10^{-11}$
$10^{-14}$
$10^{-17}$
$10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$ $10^{-2}$ $10^{-1}$ $10^{0}$
$\epsilon$
(b)
$-30$ $-40$ $-50$ $-60$ $-70$ $-80$ $-90$
$\epsilon Q$
$-J/2$
$10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$ $10^{-2}$ $10^{-1}$ $10^{0}$
$\epsilon$
EM, $\epsilon = 1$
EM, $\epsilon = 0.3$
EM, $\epsilon = 0.1$
EM, $\epsilon = 0.01$
K-means
2
0
$-2$
$-2$ 0 2
(c)