Note that $R_e$ is a function of the detection threshold $\gamma_e$. Fig. 1 displays $p_{d|ED}$ versus the distance from the source $r$ for different values of the threshold $\gamma_e$. From the figure, it becomes evident that as the threshold $\gamma_e$ is increased, the $p_{d|ED}$ curve can be approximated by a step function; $p_{d|ED}$ is close to one when the source falls inside the sensor coverage disc while it sharply falls if the source is outside. In order to achieve a fairly small false alarm probability, which is desirable in the context of monitoring applications, it is desirable to select a threshold such that the probability of detection falls to zero when the source is at a distance from the sensor; the larger the threshold the sooner the cutoff appears and the lower the false alarm probability. Assuming that $p_{d|ED}$ takes the form of the step function (see Fig. 1), then the coverage area of the pair depends on the fusion rule used. The coverage area is given by the union and intersection between two circles.