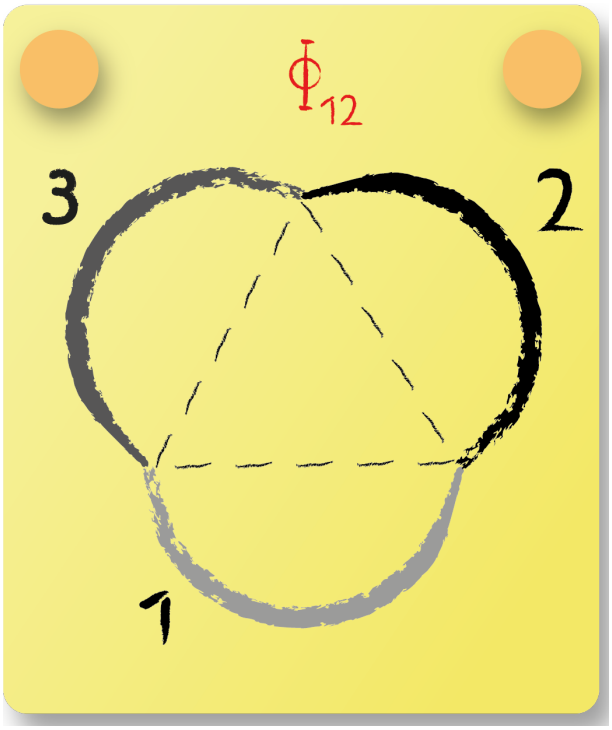
View Factor: Task 19



The image shows a combination of 3 hemisphere bodies. What is ϕ_{12}?

1 $\phi_{12} = 1/\pi$

$\phi_{1,2}$ is calculated by first calculating the view factor from the hemisphere 1 to the plane indicated by the dashed line (H). As $\phi_{H,H} = 0$, the sum rule states that $\phi_{H,1} = 1$. The reciprocity rule, $\phi_{1,H} \cdot A_1 = \phi_{H,1} \cdot A_H$, yields $\phi_{1,H} = 2/\pi$. Due to symmetry, the radiation from the supporting plane (H) will strike on body 2 and body 3 equally. Thus, the sum rule yields $\phi_{H,1} + \phi_{H,1} = 1$ and $\phi_{H,1} = 0.5$. The desired quantity $\phi_{1,2}$ is given by multiplication of $\phi_{1,H}$ and $\phi_{H,2}$ and thus $\phi_{1,2} = 1/\pi$.

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