1) DD, where: $\theta = 0.5[1 + \exp(-\alpha_1 d)]$

   d =distance

2) PDD, where: $\theta = 0.5[1 + \exp\{(\alpha_2 \log(d)) - (\alpha_1 d)\}]$

3) DIR, where: $\theta = 0.5\left[1 + \exp\{(\alpha_3 \cos(\phi - \mu)) + (\alpha_4 \sin(\phi - \mu))\}\right]$

   ϕ = the angle of emission distribution from the pollution source to each

   regional centroid and μ is the estimated mean angle.

4) DDIR, where: $\theta = 0.5\left[1 + \exp\{(\alpha_3 \cos(\phi - \mu)) + (\alpha_4 \sin(\phi - \mu)) - (\alpha_1 d)\}\right]$

5) PDDIR, where:
   $$\theta = 0.5\left[1 + \exp\{(\alpha_3 \cos(\phi - \mu)) + (\alpha_4 \sin(\phi - \mu)) + (\alpha_2 \log(d)) - (\alpha_1 d)\}\right]$$