DRAFT

$D\_{n,m}$ is a random variable with uniform distribution from $-v\_{scatt}$ to $v\_{scatt}$, $α\_{n,m}$ is a binomial random variable with parameter *n*=1 (i.e. Bernoulli trial), parameter *p* is FFS, and $v\_{scatt}$ is the maximum speed of the clutter. Figure 3 shows the resulting CDF when multiplying $D\_{n,m} $and $α\_{n,m}$. Essentially, 100\*(1-*p*)% of the scatterers will be static (have zero speed), whereas the remaining 100\*p % will have uniformly distributed speeds ranging from $-v\_{scatt}$ to $v\_{scatt}$, In other words, parameter *p* in the binomial random variable directly determines the proportion of mobile scatterers and can thus be selected to appropriately model more dynamic environment (higher *p*) or static (e.g., in case of completely static environment: *p=0* results in all scatterers having zero speed).



Figure 3. CDF of scatterer speed $α\_{n,m}D\_{n,m}$used to calculate Doppler for delayed paths. Curves show different *p* parameter for binomial distribution $α\_{n,m}$.

***Proposal 2: The impact of Tx and Rx movement should be modeled as***

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***Proposal 3: The impact of scatterer movement should be modeled as***

$v\_{n,m}=\frac{\hat{r}\_{rx,n,m}^{T}∙\overbar{v}\_{rx}+\hat{r}\_{tx,n,m}^{T}∙\overbar{v}\_{tx}+2α\_{n,m}D\_{n,m}}{λ\_{0}}$

***where*** $D\_{n,m}$ ***is a random variable with uniform distribution from*** $-v\_{scatt}$ ***to*** $v\_{scatt}$***,*** $α\_{n,m}$ ***is a binomial random variable with parameter n=1 (i.e. Bernoulli trial), parameter p is FFS, and*** $v\_{scatt}$ ***is the maximum speed of the clutter.***

# Conclusion

***Proposal 1: The impact of moving scatterers on the Doppler should be modeled as a stochastic method.***

***Proposal 2: The impact of Tx and Rx movement should be modeled as***

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***Proposal 3: The impact of scatterer movement should be modeled as***

$v\_{n,m}=\frac{\hat{r}\_{rx,n,m}^{T}∙\overbar{v}\_{rx}+\hat{r}\_{tx,n,m}^{T}∙\overbar{v}\_{tx}+2α\_{n,m}D\_{n,m}}{λ\_{0}}$

***where*** $D\_{n,m}$ **is a random variable with uniform distribution from** $-v\_{scatt}$ **to** $v\_{scatt}$**,** $α\_{n,m}$ **is a binomial random variable with parameter n=1 (i.e. Bernoulli trial), parameter p is FFS, and** $v\_{scatt}$ **is the maximum speed of the clutter.**