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| **Algorithm 1**: Surface Profile Simulation |
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| 1: | Define | $M, N,\left[u,v\right],\left(Sj| j=1,…,M\right),DNA= \left(Si| i=0,…,N\right)$ $\left\{\left(a1\left(Sj\right),b1\left(Sj\right),c1\left(Sj\right)\right) | j=1,…,M\right\}$ $\left\{\left(a2\left(Sj\right),b2\left(Sj\right),c2\left(Sj\right)\right) | j=1,…,M\right\}$  |  |
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|  |  |  |  |  |  |
| 2: | Initialization  | $$x(0)\leftarrow r\_{1}\in \left[0,1\right]$$ |
|  |  |  |
| 3: | Calculate | For $i=0,…,N-1$ |
| 4: |  | For $ j=1,…,M$ |
| 5: |  |  | $p\left(j\right)=\frac{x\left(i\right)-a1\left(Sj\right)}{b1\left(Sj\right)-a1\left(Sj\right)},q\left(j\right)=\frac{c1\left(Sj\right)-x\left(i\right)}{c1\left(Sj\right)-b1\left(Sj\right)}$  |
| 6: |  |  | $μ(j)=\max\_{}\left(0,min⁡\left(p\left(j\right),q\left(j\right)\right)\right)$  |
| 7: |  | End For |
| 8: |  | $μ(i)=\max\_{j=1,…,M}\left(μ\left(j\right)\right)$  |
| 9: |  | For $ j=1,…,M$ |
| 10: |  | If $ S(i+1)=Sj$ Then |
| 11: |  |  | $x\left(SLj\right)=a2\left(Sj\right)+μ\left(i\right)\left(b2\left(Sj\right)-a2\left(Sj\right)\right)$  |
| 12: |  |  | $x(SRj)=c2(Sj)-μ\left(i\right)\left(c2\left(Sj\right)-b2\left(Sj\right)\right)$  |
| 13: |  |  | If $ \left|x\left(i\right)-x\left(SLj\right)\right|\geq \left|x\left(i\right)-x\left(SRj\right)\right|$ Then |
| 14: |  |  | $x(i+1)=x\left(SLj\right)$  |
| 15: |  |  | Else  |
| 16: |  |  | $x(i+1)=x\left(SRj\right)$  |
| 17: |  | End For |  |
| 18: | End For |  |
|  |  |  |  |
| 19: | Output | $\left\{ i=0,…,N\right\}$  |  |
|  |  |  |  |  |  |
| 20: | Calculate | For $ k=1,…,2N$ |  |
| 21: |  | If $\left(\frac{k}{2}\right)\in N$ |  |
| 22: |  |  | $w(k)=x\left(\frac{k}{2}\right)$  |  |
| 23: |  | Else |  |  |
| 24: |  |  | $t\leftarrow r\_{2}\in \left[u,v\right]$  |  |
| 25: |  |  | $w(k)=x\left(\frac{k-1}{2}\right)×\left(1-t\right)+x\left(\frac{k-1}{2}+1\right)×t$  |
| 26: | End For |  |
|  |  |  |  |
| 27: | Output | $\left\{ k=0,…,2N\right\}$  |  |
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