Sample user codes for egs5 lists (Fortran)

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Type 1

Material name, assignment material to each region, geometry related parameters and various condition related source particle are defined at the main program like EGS4.

ucshield.f ucshield.inp ---- corresponding to ucshield.mor
ucphantom_rec.f ucphantom_rec.inp ---- corresponding to ucphantom_rec.mor

Type 2

Geometry related parameters, various conditions relate source particle are defined as the input data read from unit 4. If the scoring information is same, it is possible to run different calculations by changing input data. File type ".data" corresponding to the input data read from unit 4 and that ".inp" to the input data for pegs.

2-1 Cylinder-plane geometry

ucrz_sampl4.f, ucrz_sampl4.data, ucrz_sampl4.inp --- corresponding to ucsampl4.mor
ucrz_nai.f, ucrz_nai.data, ucrz_nai.inp ---- corresponding to ucnai3.mor

[Input data from unit 4]

Record 1	title (80A1)	Title
Record 2	nmed	Number of media in problem.
Record 3	media(j,i) (24A1)	Media names (j=1,24, i=1,nmed lines).
Record 4	ncyl,nplan	Number of cylinders (ncyl) and planes (nplan).
Record 5	cyrad	Boundary data for radius of cylinders. cyrad(i),i=1,ncyl
Record 6	zpl	Boundary data for Z planes(cm) zpl(k),k=1,nplan
Record 7	medtmp, rhotmp, ecutin, pcutin (I10,3F10.3)	Material number, density, ecut and pcut for all region at each Z-bin medtmp : material number assigned rhotmp : density. if rhotmp=0.0, default

		density is used. If medtmp is not 0, sampling option data follows.
Record 7a	Ipeangsw iedgesw, iraysw, ipolarsw, incohrsw, iprofrsw, impacrsw (7I5)	Switches for PE-angle sampling, K & L-edge fluorescence, Rayleigh scattering, Linearly-polarized photon scattering, S /Z rejection, Doppler broadening, Electron impact ionization (0=off, 1=on).
Record 8	nzbin,nrbin,medtmp,rho tmp, ecutin, pcutin (3I5,3F10.3)	Replace the material number, density, ecut and pcut for the defined region (z-bin=nzbin, r-bin=nrbin). If nzbin=0, it means the end of replacement. If medtmp=0, following sampling option data follows.
Record 8a	Ipeangsw,iedgesw, iraysw,ipolarsw, incohrsw,iprofrsw, impacrsw	Same with Record 7a
Record 9	xin,yin,zin	Incident X,Y,Z coordinates (cm)
Record 10	irin,	Incident region
Record 11	uin,vin,win	Incident direction cosines (uin,vin,win) If uin=vin=win=0, it means isotropic source.
Record 12	ixx,jxx	Starting random number seeding. If ixx = 0, ixx is set to 123457. If jxx = 0, jxx is set to 654321.
Record 13	ncases	Number of cases.
Record 14	ekein,iqin,isamp	Kinetic energy (MeV), charge of incident beam, and sampling switch. If isamp=0, a monoenergetic beam (ekein) will be used. Otherwise, a spectrum input must follow (Records 14a through 14b), which will be sampled from discrete energy (isamp=1),

		directly (isamp=2) or uniformly over the energy range (isamp=3) with weighting factor.
Record 14a	ebinmin	Only required when isamp>1(see above). Lowest energy (MeV) in spectrum.
Record 14b	ebin(i),epdf(i)	Only required when usamp>0(see above). ebin(i) is the `top-edge' of each energy bin (MeV) and epdf(i) is the corresponding probability for the bin. For example, a cross section (mb) can be used for epdf (but do not divide it by dE). The last card is a delimiter and should be blank (or contain 0.0). The i-subscript runs from 1 to nebin (nebin calculated after the delimiter).
Record 15	Iwatch	Switch for tracking events with swatch: (0=No, 1=each interaction, 2=each step)
Record 16	ibrdst,iprdst, ibrspl,nbrspl	Switches for bremsstrahlung and pair production ANGLE SAMPLING, and brems-strahlung SPLITTING: ibrdst=0 No (use default: theta=m/E) 1 Yes (recommended) iprdst=0 No (use default: theta=m/E) 1 Yes (low-order distribution) 2 Yes (recommended) ibrspl=0 No 1 Yes (NBRSPL=splitting factor)
Record 17	estepe,estepe2	Parameters used for charged particle transport

2-2 Volume element (Voxel) Geometry

Voxel geometry uses planes which are perpendicular x-, y, or z-axis. This treatment based on the way used in xyzdos.mor.

ucxyz_dose.f ucxyz_dose.data ucxyz_dose.inp ----- corresoponding to xyzdos.mor
ucxyz_dose_f.data (corresponding to benchf.inp)

ucxyz_phantom.f ucxyz_phantom.data ucxyz_phantom.inp ----- corresponding to voxel version of ucphantom_rec.mor

[Input data for unit 4]

Record 1-3		Same with cylinder plane geometry.
Record 4	maxx, maxy, maxz	Number of voxel in the X,Y,Z directions If <0, it means that number of equally spaced boundaries will be input.
Record 5	Xbound	xbound i.e. repeat the following replacing (i and x), (j and y) and (k and z) respectively. if maxx > 0 input, one per line, the maxx + 1 x boundaries if maxy < 0 input smallest x boundary, followed by abs(maxx) pairs one pr/line: voxl width, # voxls with this width
Record 6	Ybound	Ybound data
Record 7	Zbound	Zbound data
Record 8	il,iu, jl,ju, kl,ku, medtmp, rhotmp,ecutin,pcutin zpl	Line is repeated until a blank line found. For all voxels with il <=i <=iu, jl <= j <= ju kl <=k <= ku the medium used is medtmp and the density used is rhotmp. If rhotmp=0.0, the default value for that medium is used (faster than entering default density here). If iu and il are zero, it means the end of define. If medium not 0, following option is set to the regions above.
Record 8a	ipeangsw, iedgesw, iraysw, ipolarsw, incohrsw, iprofrsw, impacrsw	Switches for PE-angle sampling, K & L-edge fluorescence, Rayleigh scattering, Linearly-polarized photon scattering, S/Z rejection, Doppler broadening, electron impact ionization (0=off, 1=on).
Record 9	il,iu, jl,ju, kl,ku,izscan	Regions for which the dose will be output.

		IZSCAN non-zero to get z-scan per page, otherwise output is an x-scan per page.
Record 10	xlower, xupper	Boundaries of beam in x direction, in cm. If xlower is zero, a value near middle is taken. If XUPPER is zero, no extent in X direction.
Record 11	ylower, yupper	As for y direction.
Record 12	thetaz,thetax,thetay	thetaz: angle of beam to z axis (0 is normal) in degrees. If thetaz is zero, others assumed normal(i.e.90 deg). If thetaz is non-zero - and others both are zero. thetax is as large as possible - i.e. max cos allowed, and thetay is 90 deg. If thetax is non-zero, it may be reduced if too large, and thetay will be choosen to normalize the direction cosines.
After Record 13		Same with after Record 12 of the cylinder-slab geometry.

2-3 Combinatorial Geometry (cg) geometry

uccg_nai.f uccg_nai.data uccg_nai.inp ---- corresponding to uccgnai3.mor

uccg_phantom.f uccg_phantom.data uccg_phantom.inp ---- corresponding to uccgphantom.mor

[Input data for unit 4]

Following data must be written after cg geometry related data.

Record 1-3		Same with cylinder plane geometry.
Record 4	irlinl,irlinu,,medtmp, rhotmp, ecutin, pcutin	Set material for region from irlinl to ielinh. medtmp : material number rhotmp : If rhotmp=0.0, the default value for that medium is used. ecutin, pcutin : KINETIC energy cutoffs for electrons and photons, respectively, in MeV. If > 0, ecut(i) and pcut(i) are set. Otherwise ae and ap are used (default). irlinl =0 means end of define. If medtmp not 0, following data follows.

Record 4a	ipeangsw, iedgesw, iraysw, ipolarsw, incohrsw, iprofrsw, impacrsw	Same with Record 7 a of the cylinder-slab geometry.
After Record 5		Same with after Record 9 of the cylinder-slab geometry.